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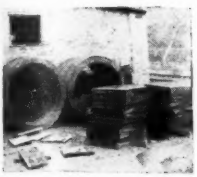

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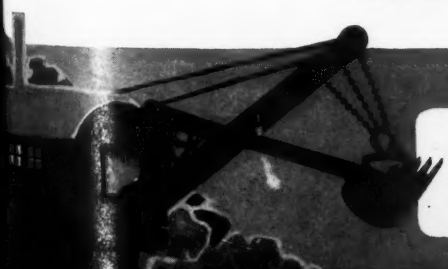

June, 1923

Index to Advertisers - - - - - Page 61
Table of Contents - - - - - - - Page 63

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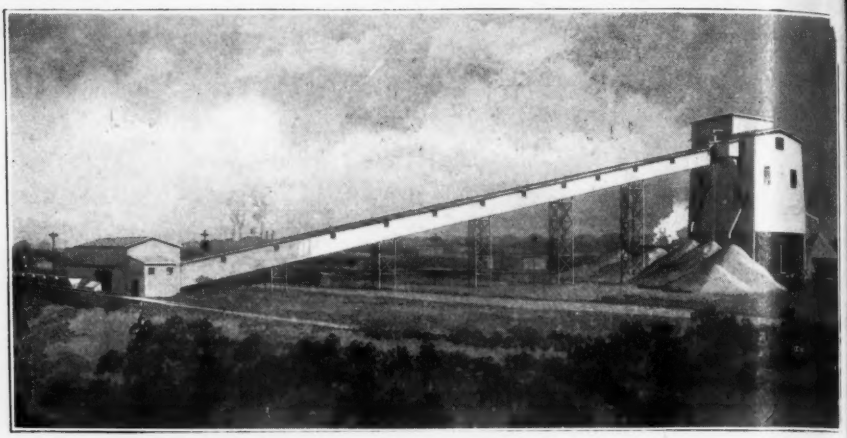

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Labor shortages are often the means of bringing plant executives to look into the economies of good conveyor equipment. Such an investigation quickly puts an end to their material handling problems, as a conveyor will always stay on the job and does more work at less cost.

Brownhoist belt conveyors will handle your materials rapidly and economically. Perfectly aligned idlers with roller bearings reduce friction to a minimum and eliminate the possibility of pulleys sticking. These features make both the idler and belt last longer.

For nearly fifty years Brownhoist engineers have been studying material handling methods. We can help you lower your costs as we have helped others. You will find that Brownhoist takes a personal interest in your particular job.

The Brown Hoisting Machinery Co., *Cleveland, Ohio.*

Branch Offices: New York, Chicago, Pittsburgh, San Francisco, New Orleans

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BROWNHOIST

MATERIAL HANDLING MACHINERY

Pit and Quarry

Member Audit Bureau of Circulations

A Monthly Journal for Producers of Sand, Gravel, Stone, Cement, Gypsum and Lime

VOL. 7 CHICAGO, ILL., JUNE, 1923 No. 9

CONTENTS OF THIS ISSUE

Program of New York Convention of National Lime Association 65
Lime Producers Express Opinions on Wet Mortar Plan. 66
Utilization of Waste Rock at Lime Plants..... 68
Keystone Agstone..... 70
Lime Company Uses Plenty of Creosote..... 70
Ads on Lime "Ancestry"..... 71
Lime Sales Follow-Up..... 72
Modern Missouri Hydrate Plant..... 74
Exercise of Judgment in Choice of Quarry Equipment.. 81
Limestone as a Constituent of Explosives..... 82
Fireproof Lime Plant Burns Marble..... 87
Lime Spoil Reclaimed..... 94
Preparing Cost System..... 96
Oil Bearing Sands of Colorado and Wyoming.....100
Heavy Trade in East.....102
Banner Weeks at Lehigh.....104
Indiana Ag Rate Down.....106
Pittsburgh Prices Same.....107
Texas Building Active.....108
Lime Prices Guaranteed.....109
Fight Wages in Ohio.....110
Powdered Coal Firing in Vertical Lime Kilns.....111
Changes in Personnel of Bureau of Mines.....111
Canadian Company Reorganized.....112

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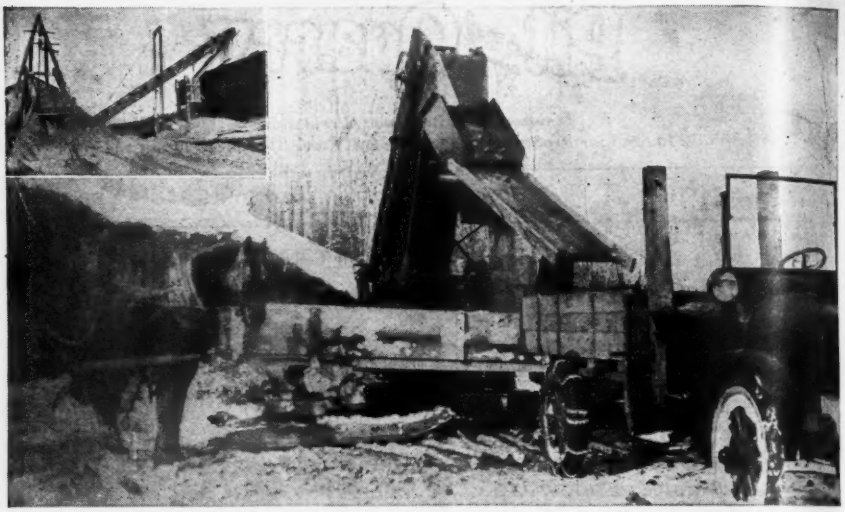


Operating a Barber-Greene Bucket Loader in a Michigan gravel pit in weather 18 below zero. Above, Barber-Greene Conveyor used in a beach sand plant near Cleveland.

18° below—90° in the shade—and men

The high cost of warm weather in sand and gravel pits is becoming an increasingly powerful influence in the purchase of labor-saving equipment. Every man has his limit and in extreme weather it is reached much sooner than under average conditions.

That is why users of Barber-Greene Bucket Loaders and Conveyors are telling our representatives that the profits made with this machinery are much greater than they at first supposed.

Some bought their Barber-Greenes because they wanted to do more work with fewer men, others because they wanted to speed up output; but only a few figured in the savings made by being relatively independent of muscle power in hot and cold weather.

Olaf Oleson, of Foster City, Michigan, was one of the first to find this out. The photograph shown above shows how he operated a gravel pit when the weather was 18 below zero.

He then used only one truck and did the rest of his hauling with logging sleds. He "shot" the bank, stripped by breaking the frozen soil off in lumps, dug out the gravel with a Barber-Greene Loader and screened it with the aid of a grizzly attachment.

In spite of the extreme weather his operations show a favorable cost because he is practically independent of muscle power. In the hot weather he operates differently, but stlll enjoys the same advantage of having production about as "level" as it can be.

For additional information about Barber-Greene Loaders and Conveyors, and how they are being used to make up for the shortage and high cost of labor, send for our N cost reports and catalog.

Barber-Greene Company, 490 W. Park Avenue, Aurora, Illinois

Representatives in ▲ thirty-three cities

BARBER GREENE

Portable Belt Conveyors — Self Feeding Bucket Loaders

Pit and Quarry

Vol. 7 Chicago, Ill., June, 1923 No. 9

Program of New York Convention of National Lime Association

Wednesday, June 13, 1923

A. M.
11:00 Meeting of Board of Directors.
P. M.
1:00 Luncheon.

Executive Session

(Open to Qualified Members of N. L. A. Only)
2:00 Opening Address.
Charles Warner, President, National Lime Association.
2:30 Executive Report of General Manager.
W. R. Phillips, General Manager, National Lime Association.
3:00 Informal Discussion.
(Open to All Members)
The entire afternoon session is to be devoted to presenting to the Membership a full report of the business condition and problems of the Association, and to informal exchange of views by all Members regarding future Association policies. No formal action on any matters will be taken at this meeting, such action being reserved for Executive Session on Friday.

Thursday, June 14, 1923

Open Session

A. M.
10:00 Opening Address.
Charles Warner, President, National Lime Association.
10:15 Report of General Manager.
W. R. Phillips, General Manager, National Lime Association.
Section 1—General Reports of Departments N. L. A.
10:30 Report of Soil Technologist.
J. A. Slipher, Soil Technologist, National Lime Association.
10:45 Report of Construction Department.
R. P. Brown, Construction Engineer, National Lime Association.
11:00 Report of Highways Department.
W. A. Freret, Special Representative, National Lime Association.
11:15 Report of Chemical Director.
M. E. Holmes, Chemical Director, National Lime Association.
Section 2—Manufacturing Subjects
11:30 Late Developments in Quarrying.
Oliver J. Bowles, Mineral Technologist, U. S. Bureau of Mines.
11:45 Efficiency of Lime Burning.
Victor J. Azbe, Combustion Engineer
P. M.
1:00 Luncheon.
(All Discussions and Demonstrations on the Following Papers Confined to Executive Session after all Papers have been Presented)

Section 3—Lime in Highways
2:00 A—Sub-Bases
B—Asphalt
W. A. Freret, Special Representative, National Lime Association.
M. E. Holmes, Chemical Director, National Lime Association.
Section 4.—The Lime Partition Block
2:30 Development and Manufacure
W. A. Freret, Special Representative, National Lime Association.
W. E. Emley, Chief Lime Section, U. S. Bureau of Standards.
Section 5—Quicksetting Lime Plaster
3:00 Outline of the Work of the Association on a Quicksetting Lime
M. E. Holmes, Chemical Director, National Lime Association
3:15 Compounds of Lime, Water and Carbon Dioxide
R. T. Haslam, Director, Laboratory of Applied Research, Mass. Inst. of Technology.
3:30 Carbonated Hydrated Lime as a Basis for Quicksetting Lime Plaster.
F. C. Mathers, Prof. of Inorganic Chemistry, Indiana University.
3:45 Effect of Burning Conditions on Time of Set of Lime Plaster.
Jas. R. Withrow, Prof. of Indust. Chemistry, Ohio State University.
4:00 Summary of Association Investigations in Development of Quicksetting Lime Plasters.
G. J. Fink, Research Chemist, National Lime Association.
Section 6—Executive Session
(Open to Qualified Members of N. L. A. Only)
4:15 Discussion of Foregoing Papers. (Open discussion)
4:30 Plant Problems in Connection with the Manufacture of Quicksetting Plaster (Open discussion)
5:00 Manufacturing Problems in Connection with the Lime Partition Block. (Open discussion)
7:00 The Association will be the Guests of the Valve Bag Company of America.

Friday, June 15, 1923

EXECUTIVE SESSION

(Open to Qualified Members of N. L. A. Only)
A.M.
10:00 Election of Officers.
(Balance of program for this session will be presented during the meeting.)

Lime Producers Express Opinions on Wet Mortar Plan

PIT AND QUARRY recently received expressions of opinion from quite a number of lime manufacturers on the subject of the sale of lime in the form of wet mortar. The general opinion seems to be favorable to such a plan. Many producers see in it a means of regaining the lime tonnage lost in the construction field at the advent of cement and gypsum. The main thoughts brought out in connection with expressions of opinion by producers are, quite properly, that the wet mortar plan cannot be operated successfully on a long haul basis, and that such a plan can become notably successful only in large centers.

The plan is working out successfully in a number of sections of the country and, undoubtedly, would lend itself to quite a number of plants in which it is not at present installed. The adoption of this method will call, of course, for a careful, or rather a cautious, preliminary survey of the market served by the plant intending to use it.

Some expressions for and against the plan follow:

Ozark White Lime Co., Fayetteville, Ark.—"I think this is one of the big new features in the lime industry. We call it aged mortar or aged putty. Architects and contractors are falling for it and dealers can make money out of it. We have been working it through a dealer for a year. It improves the quality of mortar for construction work, it improves with age, and it eliminates the possibility of burning the lime while slacking on the job, which ruins the best lime ever manufactured. Year old putty is better than the day it was slacked. The Ft. Smith Terminal Warehouse Co., of Ft. Smith, Ark., have been in the business for a year."

Hoosier Lime Co., Salem, Indiana.—"To our minds, the lime manufacturers will have to adjust themselves and take advantage of this opportunity to offset the inroads made by the various so-called quick setting mortars and time savers. This new method will, without doubt, regain some of the tonnage lost that is essentially lime basis."

Moores Lime Co., Durbin, Ohio.—"This plan is very good, providing the plant is near a large city. Conditions are not satisfactory for us; therefore, we do not follow this wet mortar plan. Several of our dealers have mortar works and from what we can gather this plan is very satisfactory."

The Ohio Hydrate & Supply Co., Woodville, Ohio.—"This plan is very good in cities where a plant can be located so as to receive sand at a minimum cost and avoid long haul deliveries. The wet mortar business was not profitable years ago in cities where they used the steel boxes and had long haul deliveries."

J. F. Groth & Son, Cedarburg, Wis.—"It appears to be a very good plan and ought to retrieve a lot of business for lime. We have followed it up to some extent, principally Mr. Hay's system, but have had no actual experience."

M. J. Grove Lime Co., Lime Kiln, Md.—"Excellent provided the haul is not too long. We have built several miles of concrete roads, mixing the mortar at our plant at Grove, Md., near Frederick, Md., and hauling same from 3 to 5 miles to the road."

Arkansas Lime Co., Ruddells, Ark.—"We think this will be worked out by plants at the large centers and that here is the best opportunity to regain lost tonnage in the plaster field. The plan is being tried by the Fort Smith Terminal Warehouse Co., dealers at Fort Smith, Ark."

Blue Bell Lime & Stone Co., Inc., Philadelphia, Pa.—"It was tried by one firm on a large scale in Philadelphia several years ago, before the motor truck age, and abandoned on account, we believe, principally of long and expensive deliveries."

Henry Cowell Lime & Cement Co., Santa Cruz., Calif.—"Quite a lot of this is being done here rather successfully. The Atlas Mortar Co., 55 Sutter St., have much experience along these lines."

Meadows Lime Kiln, Kirtland, New Mexico.—"The best method of selling yet discovered for the building trade.

Have only read about it, but think it will be successful."

The Puntenney Lime Co., Los Angeles, Calif.—"We think that's a fine proposition. There are two large mixed mortar plants here in the city, and both doing very well."

E. Dillon's Sons, Inc., Indian Rock, Va.—"Quality of mortar very much improved, and under favorable conditions as to location, etc., should be profitable to the seller and of benefit to the contractor."

St. Genevieve Lime Co., St. Louis, Mo.—"Think this may come in course of time, especially in plants in the vicinity of large centers."

F. E. Conley Stone Co., Munns, N. Y.—"Under certain conditions I think it would work out satisfactorily."

Pierce City Lime Co., Pierce City, Mo.—"Believe it good idea in large cities, big saving it seems to us."

Lander Lime Co., Lander, Wyoming.—"It is a good idea. We ourselves have never tried it out."

Greer Limestone Co., Greer, W. Va.—"A very good plan, and should be better advertised."

Commercial Lime Co., Ocala, Fla.—"We think well of it."

The Luckey Lime & Supply Co., Luckey, Ohio.—"Do not know much about it. Do not think it a very good stunt."

J. A. Creighton & Son, Thomaston, Maine.—"I should think a contractor or a user would be taking quite a chance in some cases."

Berkshire Hills Co., Gt. Barrinton, Mass.—"Do not approve."

Mr. Francis H. Davis, who since 1906 has been general manager of the Santa Cruz Portland Cement Co., at Santa Cruz, California, has recently retired and will spend the greater part of his time on his ranch at Tres Pinos. A unique testimonial was tendered to him at the time he retired, consisting of a letter from the employees, many of whom have been in the plant since 1906 and 1907. The letter was in the form of a highly embossed and artistic volume bound in Morocco and gold letter, and was signed individually by each employee in the company. Mr. Davis was very popular and successfully managed the enormous cement plant.

Made Million and Half

International Cement Corporation Has Promising Outlook

The International Cement Corporation for the year 1922 reports gross sales of $9,407,725, as against $9,172,311 in 1921. After payment of all expenses, including charges for interest and taxes, there was reported net income of $1,425,047, as against $1,529,900 in 1921. The net income for 1922, after allowing for preferred dividends, was equal to $4.06 a share earned on the 324,047 shares of common stock of no par value outstanding, as against $4.55 a share earned the year before.

The income account for 1922 and 1921 follows:

	1922	1921
Gross sales	$9,407,725	$9,172,311
Exp. dep. and depl.	7,714,096	7,156,391
Profit	$1,693,629	$2,015,920
Other income	168,451	255,206
Total income	$1,862,080	$2,271,126
Interest, taxes, etc.	437,033	741,226
Net income	$1,425,047	$1,529,900
Preferred dividends	107,016	56,056
Common dividends	850,633	738,609
Surplus	$ 467,398	$ 735,235
P.and L. surplus	$2,114,894	$1,501,418

The balance sheet shows inventory valued at $2,074,991 at the close of 1922, as against $2,645,315 at the end of 1921. Cash holdings aggregated $423,008, as against $245,007; notes receivable $208,368, as against $33,902, and accounts receivable, $1,124,316, as against $1,255,315. Notes and accounts payable totaled $453,942, as against $537,613.

Holger Struckmann president, in his statement to stockholders, said:

"Your company is in excellent position both from operating and financial standpoint to benefit by the continuance of the satisfactory general business conditions which prevailed during the year 1922 in the territories served by its subsidiaries. As indicated by the report for the first quarter for 1923, the outlook for increased earnings for the current year over the year 1922 is promising."

The Glacier Sand and Gravel Co., of Mitchell, S. D., has recently been incorporated with a capital of $50,000. The incorporators are: Wilson C. Roberts, Henry W. Hotchkiss, Richard E. Heald.

Utilization of Waste Rock at Lime Plants

By OLIVER BOWLES
Mineral Technologist, Bureau of Mines

Most of the lime manufactured in the United States is burned in various types of shaft kilns. The fuel and limestone may be added in alternating layers, as in the pot kiln, or the fuel may be burned beneath the stone, the flames and hot gases passing up through the spaces between the rock fragments. In either method it is essential that a strong draft be maintained. In some kilns the natural draft is sufficient, others employ tall stacks, while power fans may be used for forced draft. The necessity for good draft is a great detriment to the utilization of small sized fragments of stone, for if large quantities of the finer materials are mixed with the larger masses the draft is greatly retarded and imperfect calcination results. Stone varying in size from 4 to 10 or 12 inches is employed in most shaft kilns while rock below 4 inches is either discarded or diverted to other uses.

Rock too small for use in shaft kilns together with fragments that are unsuited for lime manufacture constitute a considerable percentage of the total output at many plants. The small sized stone, though chemically as pure as the high-grade kiln stone, may be difficult to market. Some plants utilize practically all of it in various ways, others use it in part, while at many plants nearly all of the small-sized or otherwise unserviceable rock is discarded as waste.

Year by year the borders of quarries are extended and they are worked at greater depth. With lack of available surface area, the presence of heavy overburden, or the difficulties of working at depth, there is a growing tendency toward underground operations. At several lime-plant quarries visited by the writer during the past summer stopes were being driven from the walls of the open pits. This tendency has a direct bearing on the problem of rock waste, for in general the proportion of fines is higher in underground than in open pit work. With a probable increase in underground work there is a corresponding increase in the necessity for profitable utilization of small sized stone.

Obviously the cost of lime-plant operation could be considerably reduced if outlets could be found for the waste rock. The purpose of this paper is to consider the various ways in which waste may be used.

Many lime-plant operators hesitate to embark on by-product enterprises because the uses, demand, supply and marketing conditions of the new products are unknown to them. Lime is their primary product and they are familiar with its manufacture and sale. Consequently it is very desirable to consider first of all any possible methods by which a larger proportion of the total rock might be converted into lime. With this object in view several lime-plant operators have introduced the rotary kiln like that used to burn Portland cement. As it requires fine-grained material its employment offers a ready means of utilizing stone that might otherwise be wasted. However, the rotary kiln is an expensive type of equipment that would scarcely be justified except in connection with large operations. Also the claim is made that the heat losses are high. It may be assumed, therefore, that the rotary kiln is not yet established as a profitable means of burning lime.

The Mount kiln, a type of continuous shaft kiln, is finding successful use in burning stone in sizes 3 to 5 inches. For large lime plants operating 20 to 24 shaft kilns, the addition of one Mount kiln for small fragments and one rotary kiln for fines is regarded by some as an ideal equipment that will utilize practically the entire quarry output. Such a balanced equipment is highly desirable for it enables the operator to turn practically his entire raw material into lime, a more desirable plan than to manufacture lime together with a series of other products. Small operators cannot, of course, operate such types of kilns, and much of the smaller rock they produce must be wasted or diverted to other uses.

It is probable that with some modification in the construction of the mod-

ern shaft kiln and with a careful grading of the stone according to size, fragments much smaller than 4 inches could be calcined successfully. The Interior Department, Bureau of Mines, is giving consideration to this problem at the present time, but the inquiry is by no means complete. The cooperation of lime manufacturers in conducting experiments of this character is greatly desired and the Bureau stands ready to discuss the problem in detail with any lime manufacturers that are interested.

Fluxing limestone is usually prepared in sizes ranging from 2 to 7 inches. Open-hearth steel furnaces usually demand stone not less than 4 or 5 inches in size, but for blast furnaces smaller stone may be used. Smelting companies that operate their own fluxing quarries may use stone as small as ¾ inch mixed in with the larger sizes, but where purchases are made from independent producers it is unlikely that sizes smaller than 2 inches would be acceptable. Thus 2 to 4 inch stone might be sold to blast furnaces in limited quantities, though a large amount of the small-sized stone would be undesirable when not mixed with the larger sizes. This use is limited not only by the demand but by transportation, for it is too low priced to justify a heavy haulage charge. Most limestone used for lime manufacture is well adapted chemically for fluxing uses, and a number of lime companies sell fluxing stone.

Small sized limestone, or fragments unsuited for lime manufacture are used extensively for road building. In districts where road stone is widely distributed and plentiful, it commands so low a price that lime plants can sell it only in limited quantities in local territory. However, some road-building projects are undertaken in regions where rock is not easily obtainable, and instances have been noted when the necessary supplies of small-sized stone have been purchased at lime plants many miles distant, even involving a combined rail and water haul. It is possible, therefore, through enterprising salesmanship, to develop a wider market for waste as road stone than that which now exists.

For the maintenance of a good road bed a continuous supply of crushed stone is required on railroad lines. Some railroads operate quarries, but most of them purchase the necessary stone from quarries situated along their lines. With care in preparing a clean stone graded closely in accordance with specifications many operators may build up a steady market for ballast rock.

Large fragments of rock unsuited for lime manufacture may be used for riprap for river or harbor work such as spillways at dams, shore protection or dock construction. Waste fragments are also used to fill in roadways and yards or for rough wall stone. Such applications are of local significance only.

Tremendous quantities of crushed stone are now used for concrete aggregate both in highway construction and in the building industries. Limestone makes a good aggregate and is very widely used. Only those quarries that are within reasonable distance of building operations may take advantage of this outlet, but as with roadstone, aggressive salesmanship may often broaden the market greatly. The manufacture of crushed stone on a large scale is commonly conducted in conjunction with lime manufacture.

Dense compact limestones of attractive color may be crushed into fragments for terrazzo floors. Marbles and certain silicate rocks are used widely in this type of flooring, but there is a demand also for a good quality of limestone.

Limestone chips may be used for facing concrete blocks to give a rock surface effect. Small limestone fragments of good color and reasonably impervious to moisture find some use in stucco and pebble-dash work.

Limestone crushed to the consistence of sand grains may be used as a substitute for sand in mortar and wall plaster. Its superiority over clean sharp silica sand is doubtful, but in regions where natural sand is scarce the substitution of a limestone product may be justified.

Limestone screenings are used with success as fine aggregate in concrete for various purposes. Concrete brick, both common and face brick, are manufactured with limestone screenings as aggregate and are said to give satisfactory service in house construction.

Limestone screenings without a binder are used for station platforms, the loose nature affording good drainage while a firm compact surface is formed by the footsteps of travelers and the wheels of baggage trucks.

Limestone crushed to granular form and screened to uniform sizes may be sold as chicken grit. The term is a general one, for the products included may be graded by size as turkey grit, pigeon grit, etc.

Pulverized limestone is widely used for liming the land. There is some question as to the desirability of using pulverized limestone as a substitute for lime on the land, but where there is a demand for it the lime-plant operator may utilize this outlet for materials that would otherwise be wasted.

The demand for agricultural limestone is seasonal, being confined largely to the spring and fall. In order to overcome the disadvantages of this fluctuating demand it is desirable to have a large storage space so that the pulverized product may be continuously prepared from waste and held in stock for the rust seasons.

Limestone pulverized to a much finer grained form than for agricultural use is finding wide application in various products. Small quantities may be added to stock food as a bone builder. A dust approximately 80 per cent of which will pass a 200-mesh screen is the most widely used filler in road asphalt surface mixtures, though slate flour and portland cement and hydrated lime are used to some extent. Ground limestone is used to a limited extent as a fertilizer filler. It has the advantage over inert fillers in that it has valuable properties as a soil conditioner. Very finely pulverized limestone may be used successfully as a whiting substitute in certain classes of rubber, paint and other products. It is essential for such uses that it be very finely ground and uniformly sized so as to exclude all comparatively large-sized grains. In general a limestone flour that will successfully meet the requirements of fillers of a type like whiting or china clay should approximate 300-mesh size. Few lime-plant quarries have the equipment for grinding or sizing to this degree of fineness, and, therefore, have not been able to utilize this promising field of application.

The Bodega Materials Co., recently incorporated at Aldridge, Illinois, have purchased two crushers of the Allis-Chalmers Co., of St. Louis, Mo. The crushers are of the gyratory type and have a capacity of from 70 to 90 tons an hour.

Keystone Agstone

Another Meeting to be Held at State College This Month

At a meeting of the National Agstone Association, Pennsylvania group, held in Pittsburgh, May 7th, two or three new members were secured and it was decided to hold another meeting, June 22nd, at State College, Pa., also including a visit and inspection trip to the farm at State College, on June 21st. This was in accordance with the invitation of President Thomas of State College.

Chairman P. B. Reinhold, of Pittsburgh, suggested that all who intended to attend this meeting, notify the secretary of the association so that suitable arrangements might be made. It was also suggested that the association furnish a speaker for Farmers Day, to be held at State College, June 14th.

The following persons were reported as having been named to serve as directors of the Pennsylvania group: Edw. S. Bixler, Newton, N. J.; J. C. King, Youngstown, Ohio; W. D. Kochersperger, Mifflinburg, Pa.; Ellwood Gilbert, New Castle, Pa.; P. B. Reinhold, Pittsburgh, Pa.

Lime Company Uses Plenty of Creosote

A firm that is not likely to see the timbering around its operations suffer rapid decay is the Mississippi Lime and Materials Company of Alton, Illinois, whose Hannibal, Missouri, hydrate plant is described in this issue. The management of this company believes in the liberal use of creosote on all wooden structures. In fact, this is one of the maintenance hobbies of Mr. Matthews. All the plants of this company will be found well creosoted and incidentally in a well preserved condition because of this creosoting.

Plans are under consideration to erect a $4,000,000, cement plant near Exeter, Calif., in the San Joaquin valley. The plant will be open for business inside a year. Mr. John F. Humburg, president of the California Copper Corp., and vice-president of the Engels Copper Mining Corp., will head the cement company.

Ads on Lime "Ancestry"

Draw Upon Geological History of Deposit for Publicity

It is not an uncommon practice when giving publicity to a person, to make allusions to his family tree and to characterize his as a worthy scion of an ancient and honorable line. But you never expected to see the lowly limestone that comes out of your quarry and goes into your kiln given publicity on the strength of what we might call, by a figure of speech, its ancestry. Well, the Torrance Lime and Fertilizer Company of Los Angeles, California, has done this steadily and persistently, and, we are given to understand, profitably.

The ancestry of limestone? To express it less figuratively, then, its geological history. That history is an interesting one and the records written in the rocks that furnish the company its lime have in them chapters that are very clear and tell of an earlier life in that section of California that is now known as the Palos Verde Hills, south of Lomita.

Years ago—about 150,000 of 'em—before old King Winter chased the first tourist to California, the southland was a tropical paradise.

The waters of the Pacific then were warmer, the soil was covered with dense and luxurious vegetation and gigantic prehistoric animals stalked their prey on the seashore.

All this has been told to scientists by oddly-shaped bits of shell and bone found imbedded in the lime quarry of the Torrance Lime and Fertilizer Company in the foothills of Lomita and a half mile from the Palos Verdes estate. A collection of fossils from this property is now on display in the window of the Marine Commercial and Savings Bank, corner of Pine and Broadway. The collection was secured for the local bank through the efforts of The Conner Service, advertising agents.

One tray in the display consists of 18 species of shells, some of which have never been found before except on European shores. Another tray contains a couch shell, which is found along the Florida coast in the West Indies, where the ocean water is much warmer.

A tray of 45 teeth from sharks is nearby. These sharks would have been maneaters—only it is believed there were no men for them to eat in those days. These triangular teeth are from three-quarters of an inch to two inches in length. From their size zoologists have been able to ascertain that their owners ranged from baby sharks to full grown adults 50 feet in length.

Each shark has 200 teeth in four rows, according to Mr. Purple, general manager of the Torrance Lime and Fertilizer Company. He stated that as each tooth becomes worn, a new one takes its place, so that there is no such thing as a toothless shark. David Starr Jordan of Stanford University, who is declared the most noted authority on water mammals, considers that the shark who "sported" five of the teeth in an adjoining tray must have been about 150 feet long. They are the largest shark's teeth ever found. The largest shark caught now is not over 35 feet long.

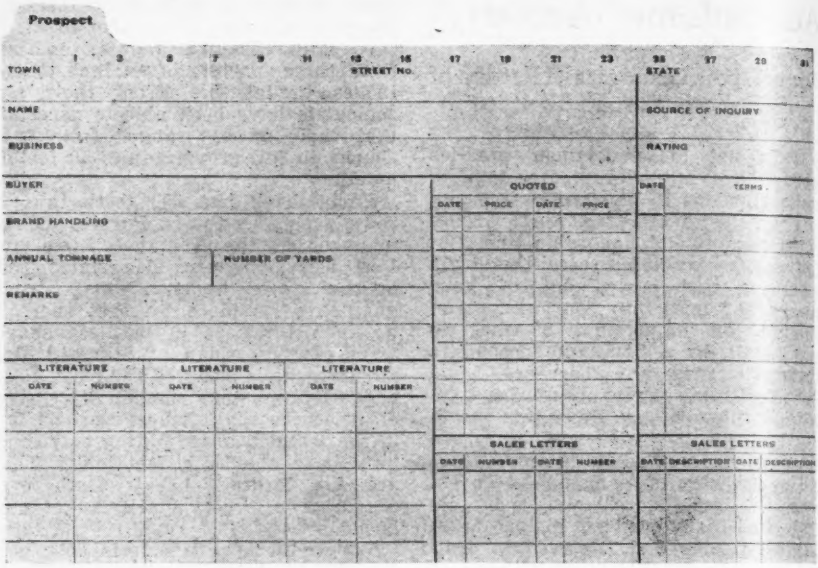
The tooth of an Imperial elephant is the largest in the display. This is an odd sized khaki colored object which weighs six and three-quarters pounds and measures eight and a half inches across the chewing surface.

The exact size of the elephant who chewed her cud with this tooth, is unknown, but it is believed that the largest Jumbo of today would be a pigmy in comparison. "The crocodiles will get you if you don't watch out," isn't very often heard in Southern California. Yet these animated leather lizards once roamed the Pacific coast. To prove it, one of them left behind, for the display, the first crocodile tooth ever found west of the Mediterranean.

In one tray vertebrae of land mammals are placed beside a vertebrae of fish. The marine vertebra is hollowed both at the sides and at the top, while the terra firma vertebra is smooth in both dimensions.

Sabre-tooth tigers, with overhanging tusks, also made their home nearby. A tooth of one of them is two and a half inches long as it stands now and is estimated to have been at least five inches long before the tiger got through using it.

Hippopotami also wallowed in Southern California mire. A tusk is a part of the fossil collection as is also a portion of the tusk bone of a mammoth. There is a lion's bone also and several bones of a prehistoric five-toed horse.



Front of Follow-up Card

Lime Sales Follow-Up

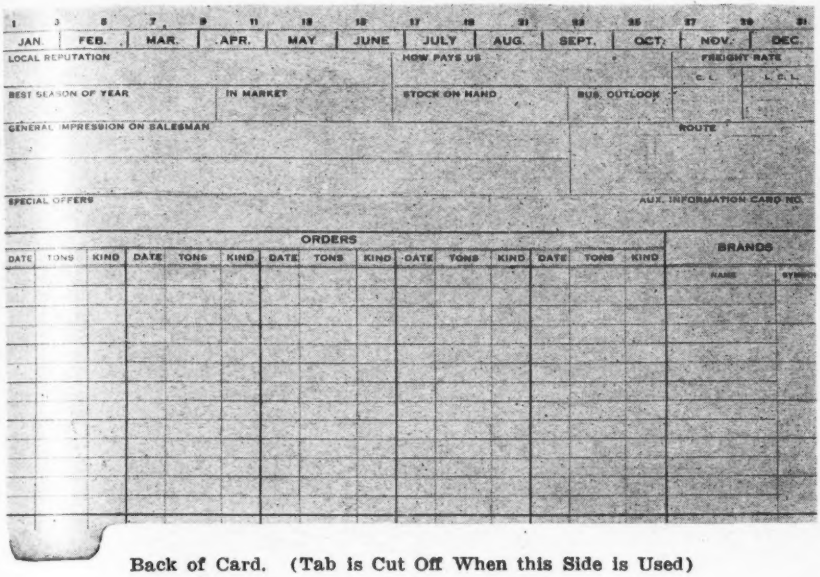
Ohio Firm Has Comprehensive System

The Luckey Lime and Supply Company of Luckey, Ohio, takes more than average care to see that customers and prospects are properly followed up for business. This company, which is known to have succeeded very well in merchandising its product, carefully indexes all possible users of lime and keeps on file information that will be of assistance in landing orders. With the installed system faithfully followed, those responsible for the selling of the company's lime need never be in doubt on any point that will have a bearing on the sales success, in any particular instance. The illustration of the cards that are used and the letter of Mr. Paul Bowers, assistant secretary, describe their methods very well and require little comment. We would, however, like to say here that we believe most producers could profitably consider the installation of such a system as Mr. Bowers describes. The installation of a card system is not costly, and the labor of keeping it up to date not onerous.

Mr. Bower's letter follows:

Whenever we write a letter to one of our customers or prospective customers we try to visualize, before we write, the effect our letter will have on the addressee. In order to do this the writer of the letter must have a knowledge of the addressee and to this end we make use of the attached combination prospect and customer card. The salesmen send in their reports and the information is taken from the reports and placed on the cards. This card is then filed in a special card file first by states alphabetically and then by cities alphabetically. For index cards we use the Library Bureau system, the indices having the name of the cities printed thereon and numbers indicating the population.

In regard to literature, we have all the different pieces of literature which we send out numbered and these numbers are entered in the proper spaces when literature is sent. We also have a number of form letters which we use and which are numbered. These numbers are entered with date in proper spaces when form letters are sent. When it is necessary to write the addressee a special letter the date and initials of writer are entered in the proper


1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
LOCAL REPUTATION
HOW PAYS US
FREIGHT RATE
C. L.
L. C. L.
BEST SEASON OF YEAR
IN MARKET
STOCK ON HAND
BUS. OUTLOOK
GENERAL IMPRESSION ON SALESMAN
ROUTE
SPECIAL OFFERS
AUX. INFORMATION CARD NO.
ORDERS
DATE TONS KIND DATE TONS KIND DATE TONS KIND DATE TONS KIND DATE TONS KIND DATE TONS KIND
BRANDS
NAME
SYMBOL

Back of Card. (Tab is Cut Off When this Side is Used)

spaces, the initials coming under the caption, "description."

The items on the reverse side of the card are for the most part self-explanatory. Whenever we get a special report from Dun's on any party, we enter as much as possible of that information on this card and also make a notation that we have in our files a special report on the party.

Expansion from the cards is provided for in an "auxiliary information card." These are small white plain ruled cards, numbered from 1 up and kept in a separate file. In case we have more information accumulating than we can get on the main card, we put this information on the smaller card and put the number of the smaller card in the proper space.

This card also acts as a record of orders. The months and numbers at the top are for "flags" to designate certain customers or prospects who are due for attention at a certain time. When the prospect becomes a customer, the "prospect" tab is clipped. The information contained on these cards is helpful not only to the sales correspondent but to the salesmen and sales manager. It assists in the injecting of the personal element of cordiality and friendliness into the sales letters or interviews.

Before writing a man or going in to interview him it is necessary to get into the mind of the writer a pretty clear knowledge of the addressee in order to know what kind of an impression you wish to make on him. To give the addressee facts which will make an impression on him we must first have an idea as to what facts he already possesses and how these facts impressed him.

The American Oolitic Stone Co., an Ohio corporation, has qualified to do business in Indiana with a total of 10,000 shares of its preferred stock, valued at $100 per share, and an equal number of shares of common stock with no par value, represented in the state. P. C. Hain, of Bloomington, Indiana, has been named state agent.

Production of portland cement was unusually heavy during the month of March, the mills of the country producing 9,000,000 barrels, which is almost 2,000,000 barrels more than in February and nearly 50 per cent more than in March, 1922. The shipments from the mills during the month of March were almost 4 per cent greater than in March, 1922.

General View of New Hydrate Plant of Mississippi Lime & Material Co. at Hannibal, Mo.

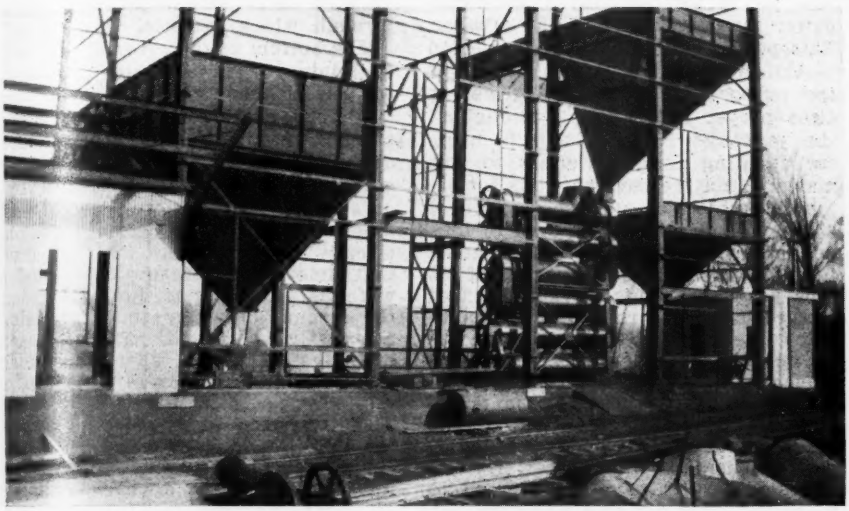
Modern Missouri Hydrate Plant

Hannibal, Missouri, is soon to have a lime operation of the most modern kind. This new plant, to be operated by the Mississippi Lime and Materials Company, under the name of the Bluff City Lime Company, has just been finished on the hydrate end and will operate until late in the season with burning facilities that have been in use for some time, and which will be replaced this fall by newer methods that will measure up to the character of the hydrate plant.

The construction of the plant is representative of the trend of thought among lime producers on the subject of fire-proof buildings. The structure that the Bluff City Lime Company has put up will reduce the fire hazard to a purely hypothetical quantity. No wood at all is used in construction work. Structural steel, sheeted over with heavy corrugated galvanized siding, is used in the construction of the building and leaves no opportunity for fire to get in its destructive work. This is the first feature of the plant that one notices. There are plenty of other features equally interesting.

Lime has been burned for many years at the location of the present Bluff City plant, and the kilns now in use are those employed in earlier operations, as already stated. These kilns are soon to be replaced by more modern and efficient equipment. Work along these lines will begin in the fall and will be finished, if the company's expectations are realized, in time for the spring operations. Right now the old plant is serving the useful purpose of producing lime for the new hydrate plant, which is the subject of this article.

The city of Hannibal, one of the leading lime producing centers of Missouri is given its importance by the fact that large quantities of Burlington limestone are exposed a short distance from the city and that the city itself has very good transportation facilities, including the Chicago, Burlington & Quincy and the St. Louis and Hannibal railroads, together with the Mississippi river. Located close to the city itself are many good markets for lime products. All these advantages, the deposits, the markets, and the trans-



A Progress View, Showing Structural Features of the Plant

portation facilities, unite to make Hannibal an important factor in the lime production activities of this section of the country.

The greater part of Marion County, in which Hannibal is located, is underlaid with Burlington limestone which has a maximum thickness of 150 feet and consists of coarsely crystalline limestone, brown to grey in color, fossiliferous, and containing rounded nodules and layers of white chert. This chert sometimes runs as high as one-fourth of the mass in the higher part of the formation, where much of the limestone is buff color and has a high magnesium content on the lower part. The 40 feet of limestone lowest in the stratum runs from light grey to white, and has a very small chert content. It is this particular stone that is valuable to the lime producer and that is used by him to the exclusion of the other material, which is very satisfactory as a crushed stone.

The limestone used for burning is very free from impurities. Calcium carbonate content runs from 90 to 99½ per cent. In the case of the Bluff City Lime Company, quarry stone that is taken out usually has a calcium carbonate content that is closer to the latter figure.

Quarrying at the Bluff City plant is against an escarpment with 8 or 9 feet of loess stripping. The quarry face contains, not far from the top, a bed of buff limestone that has in it a high percentage of iron and is somewhat magnesian in character. Its distinctive color distinguishes it readily from the more valuable limestone intended for burning, and which is found at a lower level, as described.

Beneath the Burlington formation is a ledge of Chouteau limestone that runs in thickness up to 40 feet. The upper portion of this limestone is heavily bedded and is bluish-grey to drab in color, an impure dolomite containing occasional chert nodules. The lower portion is of grey limestone, fine grained and thinly bedded with a calcium carbonate content of 90 to 95 per cent. The lower portion is sufficiently pure to be used in the manufacture of lime, but cannot be quarried economically.

At the quarry a certain amount of excavating has been accomplished by tunneling and this method will be used more freely in the future. Stripping and the depth of undesirable stone have become so heavy in places that it is only by tunneling that this stone can be secured with economy.

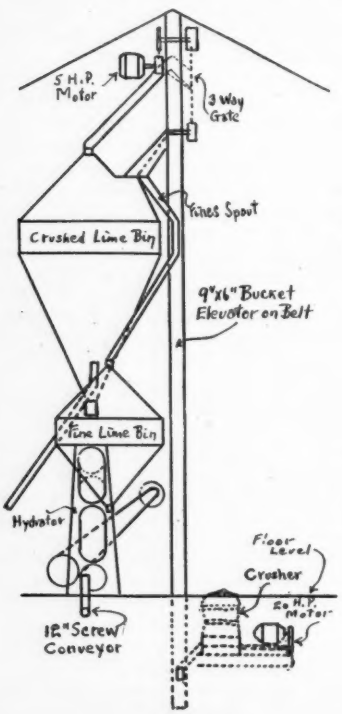
When lump lime arrives at the new hydrate plant from the kilns, it is dropped first to a No. 816 Sturtevant crusher as shown by the sketches. This crusher is located below floor level. The bottom of the pit in which it is located is 7 feet below the floor to which it is connected by stairs. In

this pit is located also a 20 horsepower motor that drives the crusher. This power unit is directly connected to the crusher. This crusher serves the purpose of reducing material to sizes proper for handling throughout the process. No provision is made for spouting back materials to this machine for recrushing. Its entire product which, at a crusher speed of 250 r.p.m., amounts from 8 to 16 tons per hour, passes to a 9x6 inch bucket elevator that has a capacity of 16 tons per hour. This elevator, 57 feet between centers, runs from a point below the spout of the crusher to the top of the building, from which it discharges by spouts to a Newaygo screen, belt-driven by a loose pulley connected to the elevator. This screen and elevator are driven by a 5 horsepower General Electric motor.

From there the lime is spouted to a crushed lime bin or a fine lime bin, both of which bins are located below the screen and alongside the elevator. The crushed lime bin has a capacity of 50 tons, and the fine lime bin a capacity of 15 tons. At the bottom of each of these bins is a sliding gate through which material is taken off.

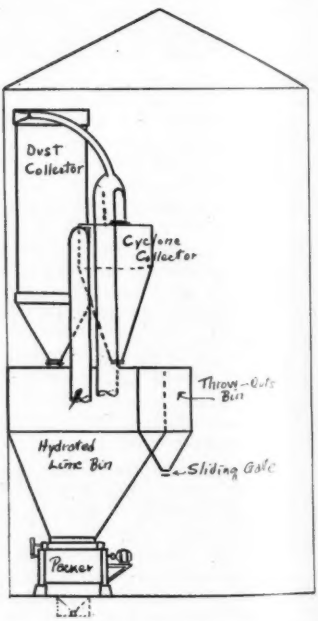
The bottom of the crushed lime bin, containing a sliding gate, is located directly at the intake of a Kritzer 6-cylinder continuous hydrator. The crushed lime introduced into the top of the cylinder of this device is passed gradually by the rotation of the cylinders to lower and lower levels until it is taken off at the bottom as scientifically hydrated lime. At the time that lime is fed into the top cylinder water is poured in at the same point, the amount of water and lime being accurately controlled. Through each cylinder extends a shaft on which is mounted a number of paddles, rotated by gears outside the cylinders. The function of the paddles is to propel the lime and water through the series of cylinders, carrying these materials the length of each cylinder and dropping from one into the next, the material at each drop reversing the direction in which it is flowing.

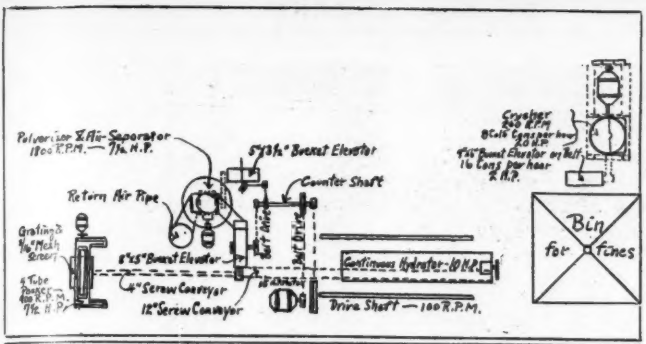
After the lime has been passed through the hydrator and is reduced to the soft fluffy condition of hydrated



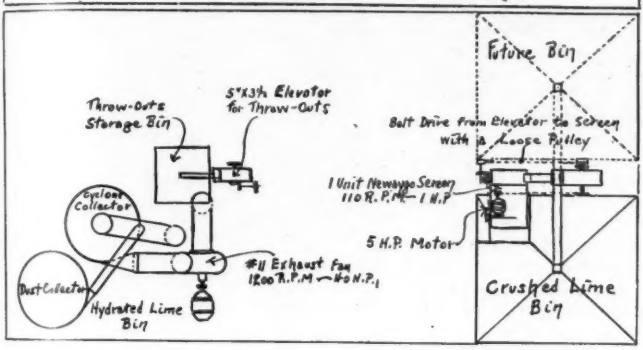
Left—
Section at Receiving End of Plant

Right—
Section at Packing End of Plant

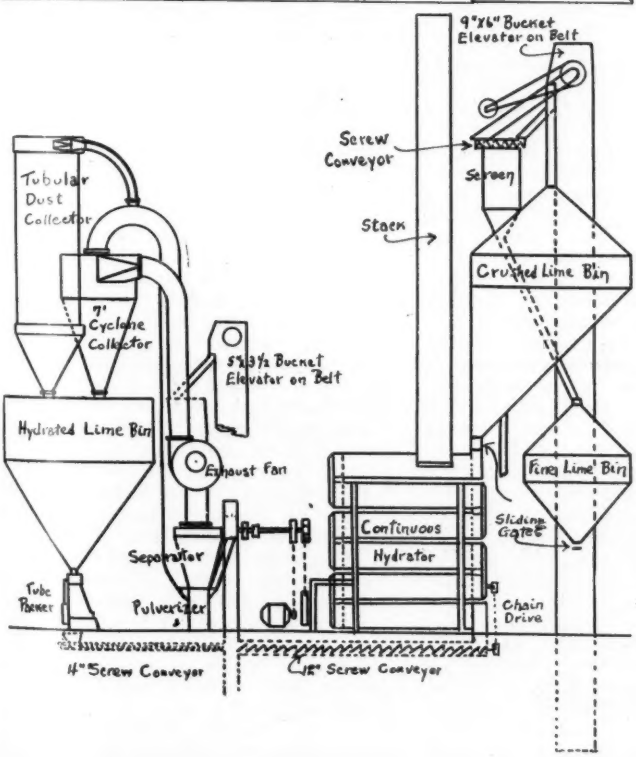




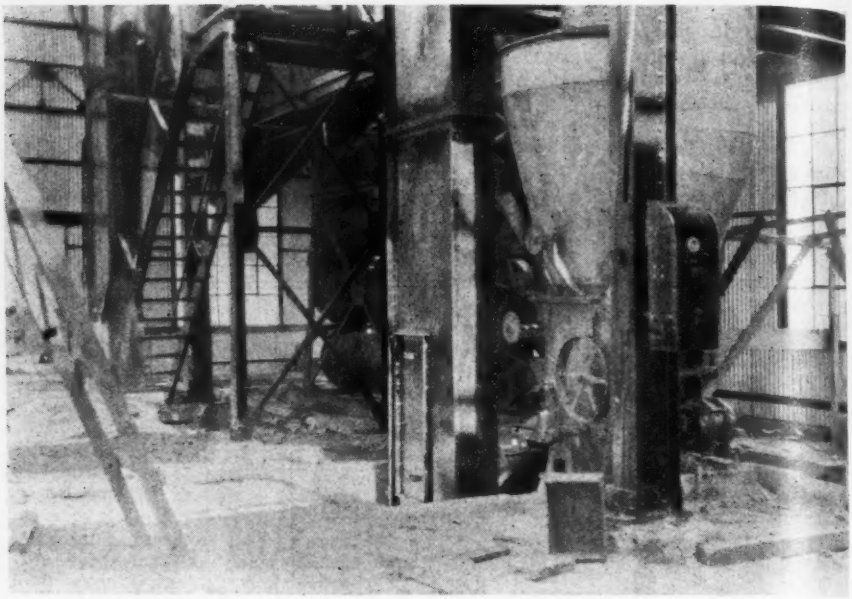
Ground Plan of Hannibal Plant of Mississippi Lime and Material Co.


Future Bin
Throw-Outs Storage Bin
5"x13½ Elevator for Throw-Outs
Belt Drive from Elevator to Screen with a Loose Pulley
1 Unit Newaygo Screen 110 R.P.M. — 1 H.P.
Cyclone Collector
5 H.P. Motor
#11 Exhaust Fan 1200 R.P.M — 40 H.P.
Dust Collector
Hydrated Lime Bin
Crushed Lime Bin

Section at Top of Crushed Lime Bin



Side Elevation, Illustrating Flow of Materials



Interior View, Showing Relative Locations of Feed Bin, Hydrator and Pulverizer

lime, it is dropped from the last cylinder to a point a few feet below the floor level, at which point it is picked up by a 12 inch screw conveyor which discharges at an 8x5 inch bucket elevator, operating vertically from a belt. This elevator raises the material a distance of about 15 feet and deposits it at the pulverizer. The hydrator and elevator are operated through a line shaft from a 15 horsepower motor. The 12 inch screw conveyor running underneath the floor and below and parallel with the hydrator is operated by a chain drive from a sprocket on the second cylinder of the hydrator, from the bottom. The hydrator requires 10 horsepower of the 15 that the motor develops. The other 5 are utilized in the running of the 12 inch screw conveyor and the elevator. The conveyor and elevator are products of the Stephens-Adamson Company of Aurora, Illinois, as are also several pieces of similar equipment throughout the plant.

The elevator just referred to discharges at a Raymond mill, which reduces the hydrated lime to the requisite fineness and allows it to be taken up by an exhaust fan to a cyclone collector and to a tubular collector and, by means of a 5x3½ inch belt conveyor running vertically on a belt, to the throw-out bin. The tubular dust collector and the cyclone collector discharge into the hydrated lime bin above a four tube packer made by the Valve Bag Company of America.

Here the hydrated material is run into bags in a manner that is familiar to all lime producers. Material that runs through the packer past the point at which bagging is done drops through the floor into a 4 inch screw conveyor running in a tunnel which is a projection of the 12 inch screw conveyor that carries hydrated lime from the hydrator.

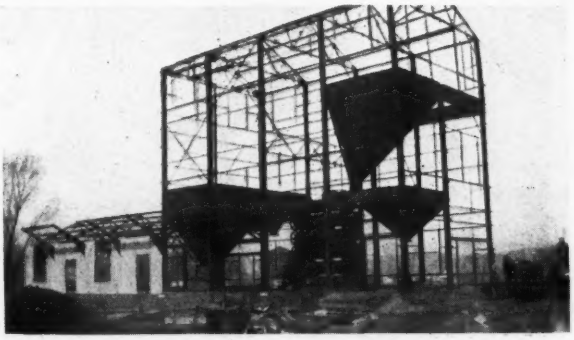
The building which houses this operation is 60 feet long, 30 feet wide and 54 feet high in the section where the machinery above described is located. In back of this section 60 feet long is another section of equal length. This latter is used for storing and shipping bagged hydrate. Loading tracks are run alongside the building and material is conveniently loaded into cars.

The steel buildings were erected for the company by the Mississippi Valley Structural Steel Company of St. Louis, Mo. This concern, which is handling the erection of many steel structures

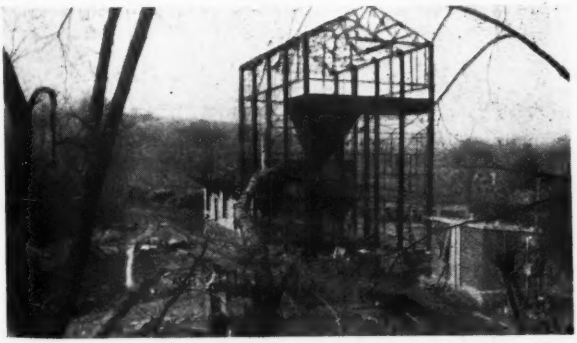
in the Middle West, had the job of placing the machinery and of fabricating and putting together the structural materials, including the heavy galvanized iron sheeting. Fabrication of the structural materials was done at Decatur Illinois.

The building is entirely fire proof and constructed in accordance with the increasing sentiment in the lime business towards the building of plants that are immune from the destructive action of the fires that, in this particular industry, are so easily and frequently started. At the time of the writer's visit, the only woodwork that could be observed around the plant were the steps in the stairs leading to various levels to which access has to be provided for the operation of the plant. This plant is one of a number recently erected that show how producers have determined to defeat their ancient enemy.

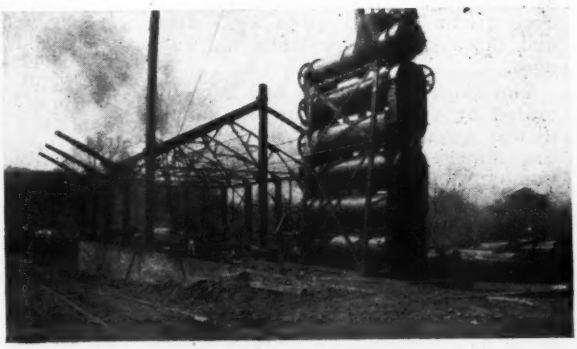
The improved calcining equipment that will be added to the Bluff City operation this fall, will be of the most modern kind. Already a considerable amount of the old equipment has been replaced by a modern crushing and screening plant that furnishes a considerable amount of material for ballasting and for use as concrete aggregate. Four square kilns are in use for the burning of the lime with which the hydrate plant just described will operate. In the fall, the burning facilities will be made to include 4 steel shaft kilns of



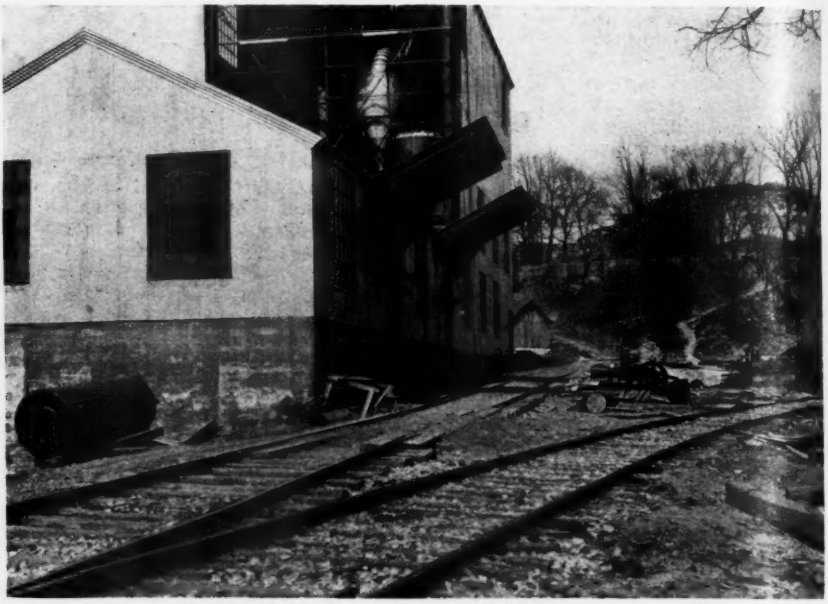
Giving an Idea of Bin Construction and Capacity



Another View of Plant in Process of Construction.



The Earliest Picture of the Plant, Showing Kritzer Hydrator in Place



Loading Track at Side of Plant. Low Section of Building in Foreground is Warehouse

modern design, and installed and equipped with the idea of producing the highest quality of lime with distinct economy.

Quarrying facilities will also be improved so that the operation of securing stone will compare favorably in cost and general convenience with the new calcining and hydrating plant.

Operations at Hannibal are in charge of Mr. A. H. Hastings, superintendent, who was formerly located at the company's plant at Alton, Illinois. Mr. Hastings has been connected with lime production for quite some time and thoroughly understands his business.

The plant at Hannibal had been operated by a number of owners before it was acquired a few years ago by the Mississippi Lime and Material Company. This concern, a member of the National Lime Association, is a live one. Association members are well acquainted with Mr. Aldous and Mr. Mathews.

Quarry operations are beginning again at Nicholson, Pa., which up till twenty years ago was the center of a thriving industry of this kind.

The Gifford-Wood Company of Hudson, N. Y., are changing the location of their Buffalo, N. Y. office to Pittsburgh, Pa. Since May 1st they have been located in the Peoples Bank Bldg., on the corner of Fourth Avenue and Wood Street. This move was decided on in order to give better service to their customers.

The St. Charles Sand and Material Co., of St. Charles, Mo., has been incorporated with a capital of $25,000. This new company has bought out the firm of Blaske, Carter and Day Sand & Material Co. and Mr. Blaske has gone in with the new concern as president. Other officers are, Mr. J. C. Willbrand, vice-president; and R. Summa secretary and treasurer.

The Bluffton-Lewisburg Stone Company, 406 Opera House Block, Lima, Ohio, announce that they have purchased the Hancock Stone Company at Findlay, Ohio, located on the T. & O. C., B. & O., L. E. & W., and Big Four Railroads. With the addition of this plant, located as it is, the Bluffton-Lewisburg Stone Company expects to serve the requirements of the trade even better than heretofor.

Exercise of Judgment in Choice of Quarry Equipment

By OLIVER BOWLES

Choice of Equipment Controlled by Conditions

Much has been written on the efficiency of methods and equipment used in rock quarries; some are highly recommended, others are condemned as wasteful or inadequate. A note of warning should be sounded, however, on the danger of applying generalities too promiscuously to individual cases, for conditions may not always justify the use of the most approved methods. First judgment of an observer at some quarries might condemn the methods employed, while an opinion based on a more mature understanding of controlling conditions might support the seemingly inefficient method. Actual working conditions constitute the basis on which the choice of all methods and equipment must find their logical support.

A Well Balanced Equipment Desirable

A lack of proper balance between the various elements that make up the total quarry equipment is a common mistake. The widely published accomplishments of a steam shovel may influence an operator to change from hand loading to steam shovel methods, and in many such instances the small crusher mouth, which was quite satisfactory for hand loaded rock, so retarded the flow of larger fragments that the advantages of a large loading shovel were practically annulled.

Again, transportation may be the weak link in the chain, for a shortage of cars will delay all operations. At one quarry observed by the writer only six cars were available to transport rock from steam shovel to crusher. Even a brief delay at the crusher resulted in suspension of loading. Also there was no reserve of loaded cars to provide for continuous plant operation during the inevitable delays of track moving and blasting. For the best service each branch of the equipment should harmonize in capacity with all other branches, for money is lost if machines are either over-worked, or are kept long in idleness.

Plant Capacity in Relation to Output

The nature and extent of the equipment should harmonize with the volume of output desired. A plant with a capacity too small for a required output, if operated under strict supervision, may be kept in good working condition for considerable periods of time, but sooner or later the necessity for major repairs will require the temporary shut down of some units with consequent loss of production. It is usually desirable to maintain equipment somewhat in excess of the necessary capacity, as machines are more easily kept in repair when they are not over-worked. Also a small excess capacity permits a ready expansion of business.

On the other hand equipment greatly in excess of that required for proposed production is not economical. The maintenance and repair charge may be low, but the operating expense of over-size machinery is usually high. Also a heavy investment means low dividends from a limited output. A serious mistake is commonly made in investing too heavily in a plant for a new enterprise, without a proper estimate of the probable returns on such investment. The modern tendency in industry, a tendency demanded of the times, is to operate plants with mechanical labor-saving equipment, but conservation should rule in gaging the size of the plant. Unless there is convincing prospect of a rapid expansion in the industry it is wise to gage plant capacity in moderate excess of first needs, and if possible to construct the plant on a unit basis, thus providing for future expansion by the erection of additional units. Operators have been known to so paralyze their resources, and restrict their working capital through over plant investment that bankruptcy has resulted.

Ill-Advised Changes in Practice

It is well for lime plant operators to keep strictly in mind that what is commonly regarded as the most efficient method may, under some circumstances, be the least efficient. Thus

the lime plant quarry operator may be so influenced by the fact that under modern wage conditions the hand loading of rock is in general more costly than steam shovel loading, that he will introduce the power shovel in his quarry. Stone for lime manufacture must, however, be sorted as to size, and sometimes as to quality, operations which the hand loader may perform while loading. The steam shovel may load at low cost, but it cannot sort its materials, and the addition of sizing equipment becomes a necessity. Thus the abandonment of hand-loading methods may involve such a heavy equipment expense that the net result may be actual loss. The mechanical handling of stone is most likely to give unsatisfactory results where employed in small quarries, for in many large plants mechanical means are employed profitably. Usually mechanical loading and sizing cannot be accomplished advantageously on a small scale, and therefore the daily output is an important factor to be taken into account in considering any proposed change in equipment.

Patchwork Equipment

In the attempt to introduce more modern machines some parts of a plant may be replaced by new and entirely different equipment while other parts remain unchanged. The results are often very unsatisfactory, for the new equipment may not properly fit in with the old. A common mistake of this character is the attempt to load rock with steam shovels into cars adapted for hand loading. The latter are usually too small for effective steam shovel work, but their greatest fault is insufficient strength to withstand the rough treatment of steam shovel loading. Thus while the operator may save the expense of purchasing new cars, the repair charges are likely to be excessive. Sometimes weak cars are reinforced to meet the more strenuous requirements, but the remodelling of old cars to adapt them to new uses is often unsatisfactory, and may be more expensive in the end than the purchase of new cars.

Similar lack of harmony has been noted in cement plants where attempts have been made to change from a dry to a wet method with as little modification as possible in plant design. Thus larger kilns may be installed while the same grinding and mixing equipment is retained. The raw materials are ground dry, mixed in a dry state, after which water is added and the mixture burned in slurry form. Whatever advantages might be gained by grinding wet, and mixing in slurry tanks, are lost, and at the same time additional heat is required to drive off the water. Thus through partial adjustment the plant possesses the disadvantages of both methods, and gains little or none of the advantage that might result from a properly designed wet-burning plant. While the above is not a quarry problem it illustrates the ill-effects of a patchwork equipment.

It is evident therefore that in planning any decided changes in equipment careful consideration should be given to the necessary modifications in other machines that form necessary links in a complete and well-designed plant.

Limestone As a Constituent Of Explosives

Limestone, more or less pure, is used in many types of blasting explosives, as it acts an antacid, state C. A. Taylor and William H. Rinkenbach, assistant explosives chemists, of the Department of the Interior, in Bulletin 219, recently issued by the Bureau of Mines. The form in which it is used ranges from a rather pure calcium carbonate to marble dust containing as much magnesium as calcium. Generally it is used as the only antacid, but sometimes with another antacid, such as zinc oxide. The average dynamite contains less than 1.5 per cent of calcium carbonate, but special powders have contained as high as 15 per cent. The impurities in limestone are of no practical importance in the manufacture of explosives.

Fire almost completely destroyed the plant of the Crystal Carbonate Lime Company at Elsberry, Mo., doing a damage estimated at $60,000. The origin of the fire was not determined.

Announcement has been made that the Marquette Cement Manufacturing Co., of Chicago, has purchased the Cape Girardeau Portland Cement Company, at the reported price of $2,000,000.

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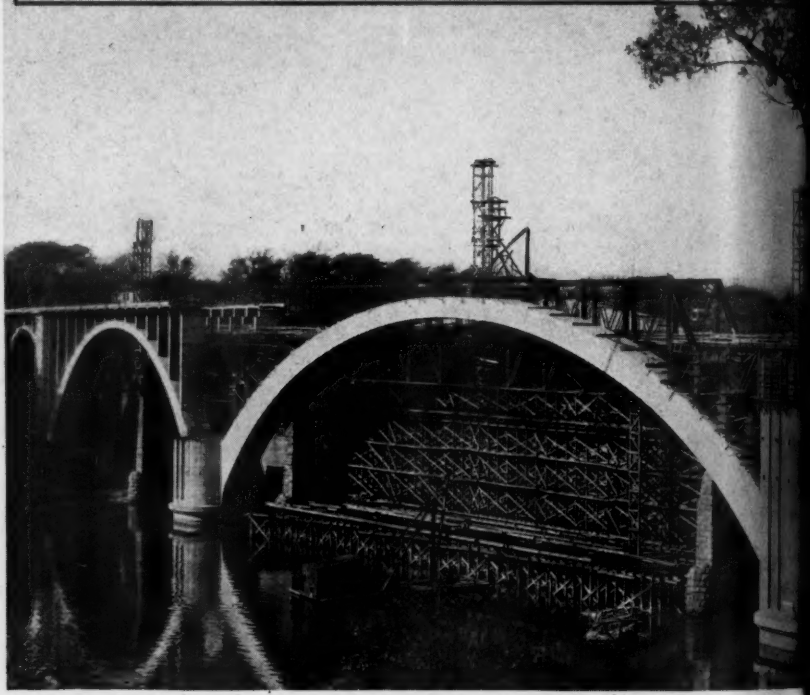
Pit and Quarry

Rand McNally Building
CHICAGO

PLYMOUT

Gasoline Locomo

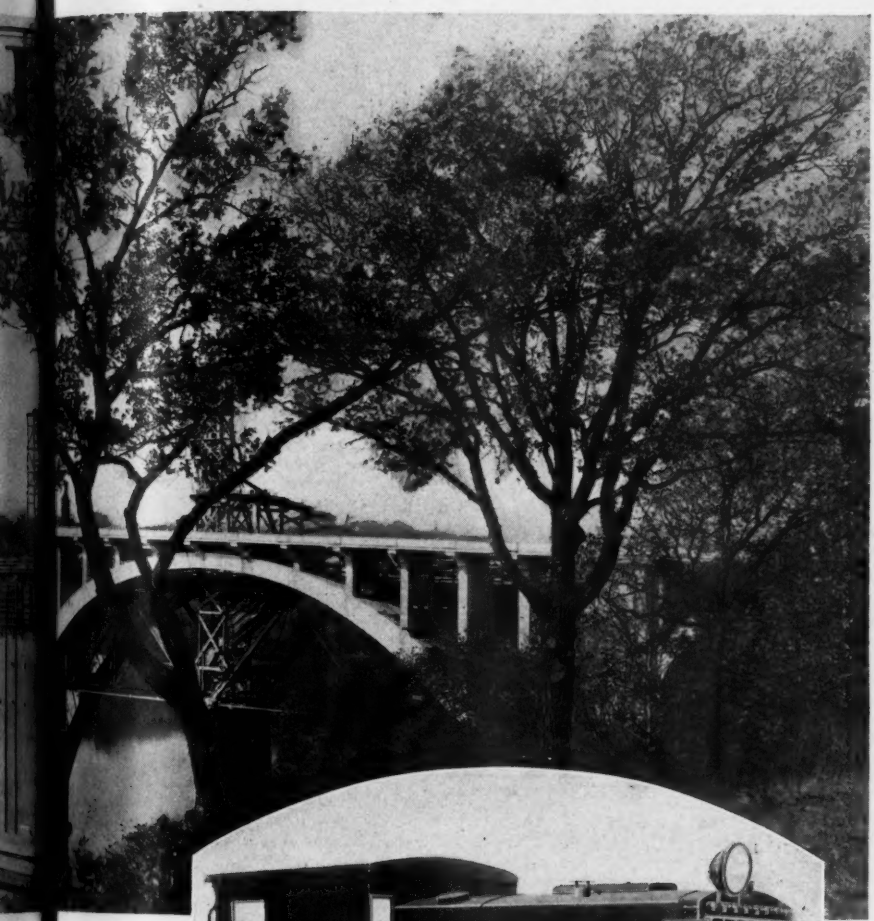


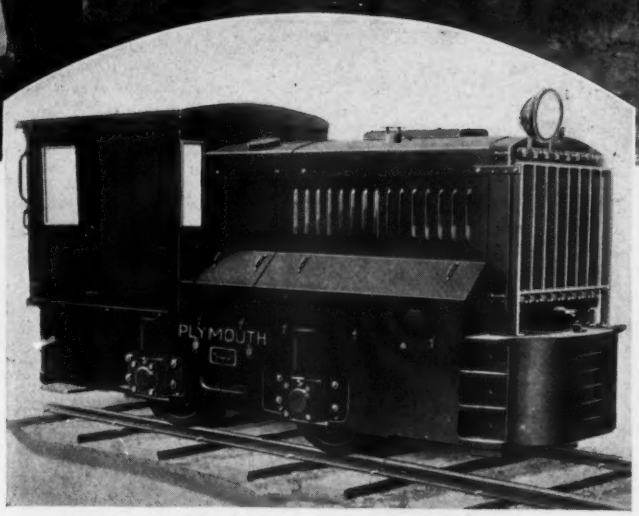
Plymouth Locomotives He uil
Cappelen Memorial Br

The Cappelen Memorial Bridge, Minneapolis, is over 1,000 feet in length. The er spa
400 feet in length, and is the longest concrete arch ever constructed in bridge countr
The bridge contains 32,000 yards of concrete, 900 tons of reinforced steel and 1 bricate
City Engineer Elsberg states: "The use of PLYMOUTH Gasoline Locomotives in c the cer
mixing plant has worked out very efficiently and economically."

Write for Catalogue and Performance Vie

THE FATE-ROOT-HEATH CO. , O





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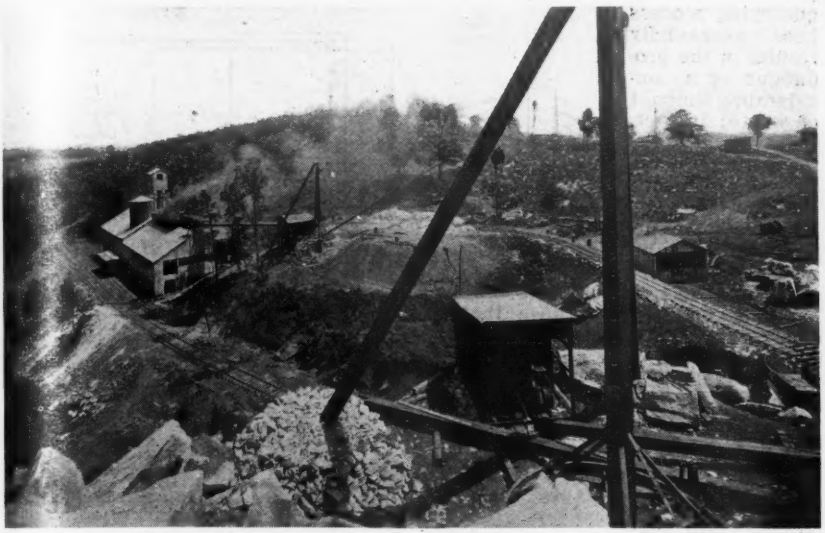
Above—Breaking Yard where Marble from Quarry Is Reduced to Kiln Size.

At Right—Top of Kilns, Showing Arrangement for Charging.

Marble Quarry from which is Secured the Broken Marble on Which Plant Operates.



Burning and Hydrate Plant of Williams Lime Manufacturing Company.

Fireproof Lime Plant Burns Marble Secured without Quarrying

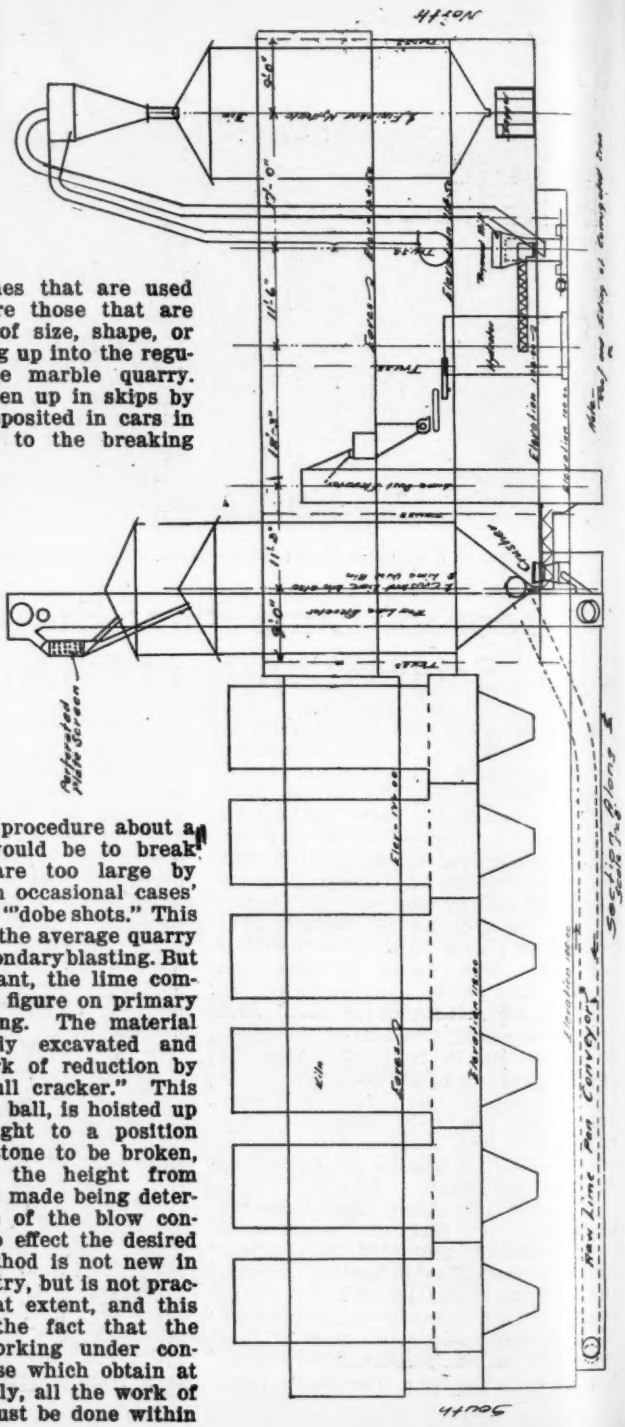
When the Williams Lime Manufacturing Company of Knoxville, Tennessee, decided to build a new lime plant, they decided at the same time to build a lime plant of the most modern description, so designed as to give efficient and economical production, and so constructed as to require little upkeep cost and to effect a great reduction in the fire hazard that is ever present in plants built of combustible material. The pages of PIT AND QUARRY have in the past year recorded instance after instance of plant fires brought about by the heat of the kilns, by sparks or, in confined spaces, by spontaneous combustion. The Williams Company took the best course out. They put up a structure made entirely of steel, durable, more openly arranged than a wooden structure, and with no fire hazard.

The Williams Lime Manufacturing Company's new plant is the latest of a considerable group of lime plants around Knoxville. Spoiled marble from the many marble quarries of the section makes available a good supply of lime material, procurable at low cost, and makes possible the production of very fine lime. The plants operating from material secured from the waste piles of marble quarries have a material on which a large part of the work of quarrying has already been accomplished, and which requires in most cases but further reduction to proper and convenient size and transportation to kilns. In this section also is located the plant of an officer and well-known member of the National Lime Association, Mr. Milton McDermott of the Knoxville Sand and Transportation Company. Mr. McDermott's plant is at the present time also in process of change, and will in a short time be operating with increased efficiency and greater output.

The plant was designed by Sehorn and Kennedy, engineers, of Knoxville, and construction was supervised by them. Mr. E. A. Sehorn, a member of the firm, was particularly active throughout the progress of the work. Mr. Eberhardt of the Schaffer Engineering and Equipment Co. of Pittsburgh, was associated with Mr. Sehorn.

Close to the plant of the Williams Lime Manufacturing Company is the marble quarry shown in a number of the accompanying views. As can be seen from a study of the views, the

quarrying process here necessarily results in the production of a considerable amount of waste; in fact, there is in sight for the lime plant at the present time, a supply of lime material sufficient for a number of years' operations. The stones that are used for lime making are those that are unsuitable because of size, shape, or condition, for making up into the regular products of the marble quarry. This waste is taken up in skips by the derricks and deposited in cars in which it is hauled to the breaking yard. The stone is mostly of too large size for feeding into the kilns and is brought down to correct proportions in the breaking yard.



The breaking operation is interesting to the average quarryman, in that no explosives are used for reduction of the stone to handling size. The ordinary procedure about a limestone quarry would be to break down stones that are too large by "block holing" or, in occasional cases' by "mud capping" or "'dobe shots." This would constitute at the average quarry the operation of secondary blasting. But at the Knoxville plant, the lime company has neither to figure on primary or secondary blasting. The material is delivered already excavated and they finish the work of reduction by the use of the "skull cracker." This device, a heavy iron ball, is hoisted up by a derrick, brought to a position directly above the stone to be broken, and then released, the height from which the release is made being determined by the force of the blow considered necessary to effect the desired reduction. The method is not new in the quarrying industry, but is not practiced to a very great extent, and this often because of the fact that the operator is not working under conditions such as those which obtain at this plant. Obviously, all the work of the skull cracker must be done within

North
South
Storage Space for filled Bags and Barrels
Barrel machine
Crusher
Crushed Lime Elevator
Screen for Lime Dust
Motor
Dust Elevator
Elevation 100.00
Elevation 100.00
Elev. 112.0
Elev. 112.0
8' Door
8' Door
Weighmaster for loading
Crushed lime into cars
Storage Shop
Elev. 114.5
Barrel shute floor
Crushed Lime Bin
Hole in floor
Raymond
Pan
Dust Bin
Finished Hydrate Bin

Top of Hydrator, Stacks and Poidometer. Mr. Harold Williams, Sec'y and Treas., in Background.

a distinctly limited area. This means that the stone must be conveyed to one particular point, unloaded, cracked, and reloaded for putting through the plant process. A close study would undoubtedly show economies in the method under the proper conditions. These conditions are observed at the Williams plant.

It will be noted that the derrick is a piece of equipment used more at this operation than at most. Here again the conditions peculiar to the operation make its use more economical than it would be in other cases.

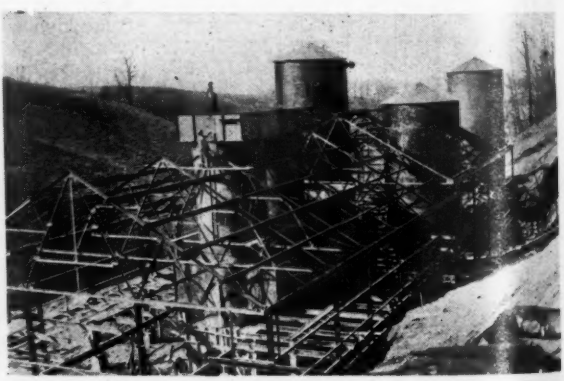
After the breaking operation is accomplished, stone is loaded into side dump cars and conveyed a short distance to the tops of the kilns. It will be seen from a study of the general plant view that proper advantage is taken of the force of gravity. Materials do not have to be elevated to the tops of the kilns—that is, aside from what elevation is done in raising them originally from the quarry, and in the loading and unloading processes incidental to the breaking action.

The accompanying views show the method of charging kilns. At the top of each kiln is hopper space sufficient to keep a good supply of stone ahead of the burning operation at all times.

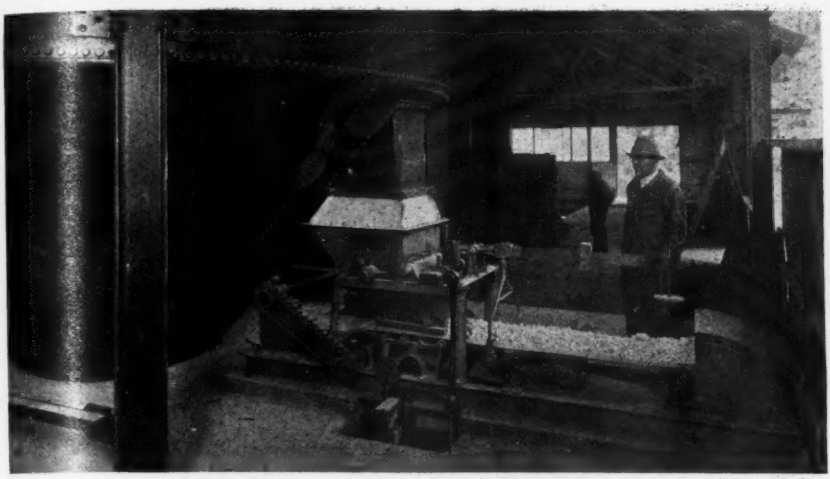
The plant has been built to operate with 6 kilns, but all of these have not been put in up to the present time. It was the original intention of the company to install 3 of these 6 kilns, but this decision has been changed to include 4 kilns, giving thus two-thirds of the capacity for which the plant was originally built. Additional kilns will be put in later, nearer to the receiving end of the building. This means it will be unnecessary to make any changes in the plant outside of cutting openings for the new kiln equipment. A pan conveyor, which carries raw lime to the finishing department has been built up to a point where its operation will include the two kilns that will later be installed.

The kilns, 11 feet in diameter and measuring 38 feet from the top of the hopper to the bottom of the shears, are products of the Arnold & Weigel Company of Woodville, Ohio. They are equipped with furnaces on two sides and with the firing floor conveniently arranged. Burning is done entirely by coal. This firing floor extends some 85 feet from the receiving end of the building to the end of the burning department and is a few feet lower than the level of the floor of the finishing department.

After the lime has been taken from the cooling cone of the kiln and



Progress View Taken in Last Week of February, Showing Method of Construction.

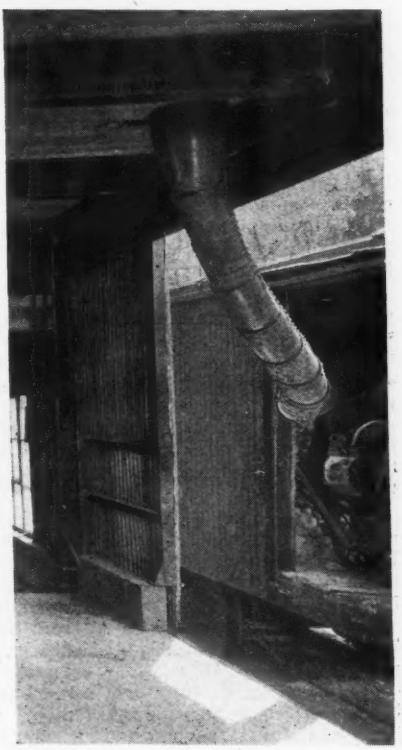


Special Schaffer Poidometer Weighing Crushed Lime for Bulk Car Shipment. Mr. E. A. Sehorn in Back of Poidometer.

dropped on the lime house floor, the lime house men shovel or scoop the raw material through openings in steel plates which cover the entire length of the conveyor pit. During the process of loading lime into this conveyor, the men reject any overburns, cores or foreign material which may occur in the lime. This, by the way, is the only time in its course through the plant that the lime is handled by hand.

The raw lime pan conveyor, manufactured by the Jeffrey Manufacturing Company of Columbus, Ohio, runs the full length of the lime house and beyond into the finishing plant, running 10 feet higher at the discharge end. The steel plates over the entire length of the conveyor pit are removable, making it possible to shovel the lime into the conveyor at any point.

This pan delivers to a Sturtevant crusher which reduces the material to 1½ inch and under. The crusher, mounted at floor level, spouts its product to a vertical bucket elevator, 70 feet between centers. This elevator conveys the raw lime to the highest point in the plant. The discharge of this elevator is in a small house located above the main structure, in which house is a stationary plate screen with $\frac{1}{16}$ inch perforations. Lime passing over the screen goes to the crushed lime storage tank; lime passing through the screen openings goes to the dust storage bin. Delivery from the screens to the bins is entirely by gravity.



Flexible Spout and Barber-Greene Loader Fed by Poidometer Above

Firing Floor, Showing One Side of Furnaces of Battery of Four Arnold and Weigel Kilns

The purpose of the lime dust bin is to serve as a source of supply for the hydrating department. Material is drawn off from this bin by a screw conveyor and delivered to a 38-foot lift vertical elevator. This vertical elevator deposits the lime dust in a flood hopper above a poidometer manufactured by the Schaeffer Engineering and Equipment Co.

The purpose of the poidometer is to regulate the flow of lime dust and water into the Schaeffer hydrator. Exact proportions of lime and water are fed into the hydrator and pass through successive stages of this piece of equipment to the bottom, where thoroughly hydrated lime is drawn off by a screw conveyor and passed to a Raymond mill.

After reduction to the necessary fineness, the material is taken from the Raymond mill and passed to the finished hydrate bin. Underneath this hydrate bin is a 4-tube Bates packer.

Crushed lime may be taken from the bottom of the bin and loaded into barrels through a Howes barrel packer or may be loaded into cars by a Barber-Greene box car loader fed by a flexible spout. The method of weighing the lime that goes into the cars is through a Schaeffer poidometer, as shown.

Head End of Steel Pan Conveyor

With this poidometer, which has a weighmaster attachment, the company loads crushed lime loose in cars. By so weighing the bulk shipments, the

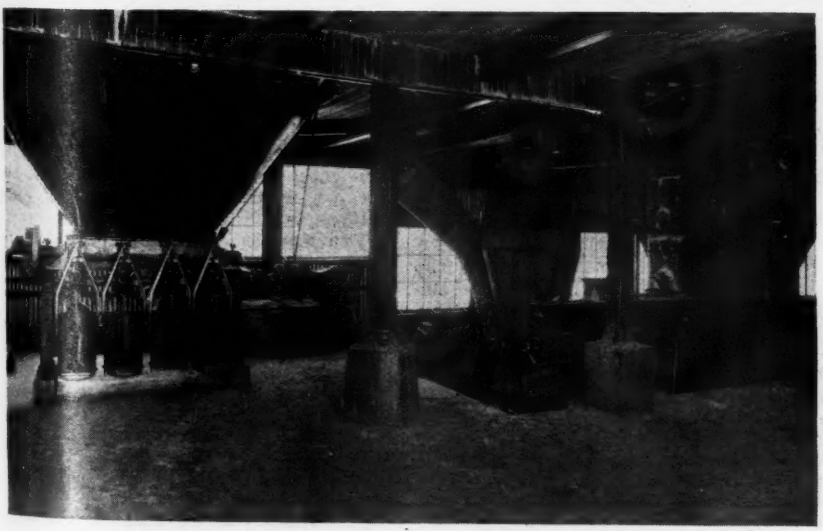
expense and upkeep of a railway track scale is saved.

All machines throughout the plant are equipped with individual motors. These motors are products of the General Electric Company and have automatic stop and start switches that are actuated by the flooding or by the lack of material.

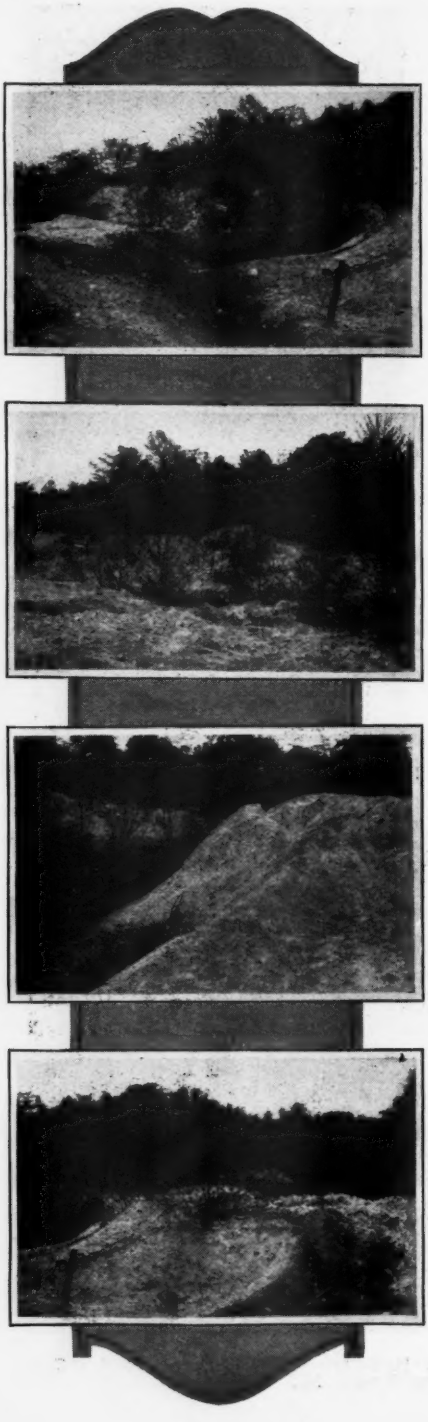
The steel buildings were erected by the Converse Bridge and Steel Company of Chattanooga. Walsh and Weidner of Chattanooga furnished the storage tanks. The elevators and pan conveyors were furnished by the Jeffrey Manufacturing Company of Columbus, Ohio, and the derricks by the American Hoist and Derrick Company of St. Paul, Minnesota.

Most lime plant operators will see unusual features in this plant of the Williams Lime Manufacturing Co. The method of securing material is, of course, dependent upon purely local conditions and differs greatly from the methods in vogue around the average operation. Probably the use of the skull cracker will give a few operators something to think about. The method cannot, of course, be applied with any degree of economy to the usual lime operation but there might be room for such a system around a few plants where conditions approximate those at the Williams Lime Manufacturing Co.

Howes Barrel Packer, Fed from Crushed Lime Bin Above



Bates Packer, Raymond Mill and Schaffer Hydrator. Mr. Eberhardt of Schaffer Company Standing Beside Mill



Lime Spoil Reclaimed

Masses of Waste Converted into Agricultural Lime

An unusual lime development is that of the Utica Lime Company, whose office is at Seymour, Indiana, but whose plant is located at Utica on the Ohio River, a short distance east of Jeffersonville. This plant is located at one of the largest and best deposits of limestone in the locality and has three or four old kilns, built into the bluff, which did good service for a long time, but which have not been used for several years.

The men who burned lime at this plant were working before the time of the general use of hydrated lime, producing lump lime for the general material market. The lump lime was carefully hand picked, leaving considerable percentage of fine material which was thrown onto a spoil bank. In the course of years, this accumulated until now there are now many thousands of tons of this material piled up around the plant.

It just happens that the soil of this part of Indiana can use to advantage almost unlimited quantities of lime for the correction of acidity, so the present company, of which Mr. C. R. Jackson of Seymour, Indiana, is the active manager, is reclaiming this material and converting it into agricultural lime.

This is not so simple an operation as it would appear, because of the fact that while the spoil banks have carbonated over the outside, this carbonation extends only for a few inches, below which the material is soft lime putty.

The process of operation is as follows: The lime is shoveled into cars, each containing 1½ tons of material, taken up an incline by a steam hoist, dumped into a bin, which feeds into a scraper conveyor, and this dumps the material into a rotary dryer, which revolves at the rate of two times per minute. This thoroughly dries the material, tests showing that 30 to 40 per cent by weight of this is removed as moisture. From the dryer the material is passed to a Day pulverizer which reduces it so that 95 per cent will pass through a screen of 10-mesh, and at least 40 per cent will pass a 100-mesh screen. From the pulverizer

More views of the Operation of the Utica Lime Company, at Utica, Indiana.

the material is elevated to a large bin, from which it is packed into 100-pound burlap bags.

Much of this material is shipped on the river in barges, and some is hauled to the railroad in large trucks. The company has been successful in marketing a good tonnage this season, but has had considerable difficulty in obtaining cars.

Chemical analysis of the material shows that it contains 25 to 40 per cent calcium hydroxide, the remainder being calcium carbonate. Utica agricultural lime gives quick results, and is packed in a form that saves the farmers much in labor of transporting and applying. It is possible to use this material in an ordinary fertilizing attachment to a grain drill.

The company also expects to put the kilns in operation for burning lime and will also produce commercial crushed stone.

The Color Factor in Talc

A very pure white is demanded by many consumers of talc, but no standard, accurate method of detecting slight differences in color has been devised, states R. B. Ladoo, mineral technologist of the Bureau of Mines, who has completed a study of the mining, milling and uses of talc for the Department of the Interior. Practically all talc producers make a rough comparative test by the unaided eye, usually comparing talcs to a sample taken as a standard, which varies for each producer and consumer. The talc is either placed in little heaps or is spread out flat with the finger or a knife, on the hand, or on blue or white paper. Probably the best method now in use consists of forming two small piles of the material used as a standard and of the talc to be tested, pushing the heaps close together and flattening them with a spatula so that the contact between the heaps is a smooth straight line. If the talcs are then wet with a few drops of turpentine, slight differences in color may be detected; but even this method is not satisfactory, as no standard samples are used in common by the whole industry, and differences in light and in human perception give different results. Often the accurate determination of slight color differences is of utmost importance, for color is not only an index of value but frequently is an indicator of proper methods of grinding. Poor color is not always due to impurities, but may be due to insufficient methods or improper grinding. Thus a yellow hue in a talc was attributed to iron, but microscopic examination proved that finer grinding would eliminate most of the objectionable tint. Finer grinding of many talcs improves the color. A uniform and standard method for the determination of color should be devised and adopted.

The contract for the erection of the State Cement plant at Sioux Falls, S. D., has been let to Carlson and Snitkey of Sioux Falls. These buildings will call for an expenditure of about $500,000, and work will be started at once. The total cost of the cement plant is estimated at $2,000,000.

Mr. Harold H. Perry, Manager's Assistant, of the Industrial Works, Bay City, Michigan, sailed April 28th for England. While he is abroad, Mr. Perry intends to make an extensive study of locomotive and wrecking cranes as used in that country.

Preparing Cost System

Sand and Gravel Association Has Expert at Work — Other Washington News

(By Our Washington Correspondent)

In a decision rendered by the United States Supreme Court May 21, it was held that a state cannot control freight rates upon a commodity shipped between points within its border when the article is intended for public improvements. The court rendered its decision in two cases brought by the United States, the Interstate Commerce Commission and a number of railroads against the state of Tennessee. In complying with the orders of the Interstate Commerce Commission for an increase in freight rates upon railroads on state traffic, Tennessee, through its railroad and public utilities commission, provided that the old rates should be maintained upon carload shipments of stone and gravel within the state when intended for use in building public highways. The state won in the United States district court for middle Tennessee.

The National Association of Sand and Gravel Producers has almost completed a uniform cost accounting system which will be adaptable to each member's operations. This system will form a part of the association service and will be furnished to members only. An expert accountant has recently looked over typical sand and gravel plants with a view to outlining the system. A widespread interest has been manifested in the adoption of a uniform cost accounting system, and at the last annual convention the preparation of such a system was laid down by the executive committee as one of the things to be accomplished by the association this year. It was felt that if all members used the same principles in arriving at their costs, a more healthful condition in the industry would be obtained and competition would be placed on a more intelligent basis.

The principal highways of every state should be constructed as rapidly as the available supply of labor and materials permits, and they should be constructed and maintained by the state highway departments and they should be paid for by the people of the states as a whole, according to Thomas H. MacDonald, chief of the Bureau of Public Roads, Department of Agriculture. Mr. MacDonald says that actual road tests have shown that the annual saving in gasoline alone on the more important roads will, in some instances, more than pay the yearly cost of such roads, including a proper distribution of the first cost. The public pays for good roads whether it builds them or not. This fact alone, without regard to the increased need for highway transportation to supplement the railroads, the saving in wear and tear on vehicles, and the social, recreational and educational advantages of good roads in rural sections, Mr. MacDonald says, should cause the states to proceed with their improvement of their main roads as fast as physical limitations permit.

The burden of building and maintaining the main state roads must be shouldered by the state, in Mr. MacDonald's opinion. It is not fair to expect a country to provide for the construction and upkeep of the main state roads within its borders when, as is generally the case, the traffic on such roads comes in greater part from outside of the county. The attempt to finance the improvement of such roads has been the means of bringing a good many counties to the point where they are not able to properly provide for the feeder roads, which should be their principal concern.

The allocation among the states of surplus war materials available and suitable for road-building work has given a decided impetus to the building of good roads in every part of the country. On March 31, it is reported, 7,355 miles had been completed since the beginning of the fiscal year, and with three months of good construction weather still remaining it appears likely that the 10,000 miles completed in the preceding fiscal year will at least be equaled. At the same time prospects are good for rapid progress during the coming fiscal year, as on March 31 there was under construction 14,010 miles and slightly more than 10,000 miles in projects approved, but which have not yet reached the construction stage.

A comprehensive study is now being made of the road needs of the national forests. The figures available indicate that to complete the necessary system

of forest development roads and trails, 13,560 miles of roads and 37,114 miles of trails must be constructed at an estimated expenditure of $64,693,000. For the system of forest highways of primary importance to the states, counties, and communities the rough survey indicates that $107,658,000 must be expended for construction or improvement. If the present current appropriations are continued, it appears possible to complete the development of an adequate road system within the national forests covering all requirements in from 20 to 26 years.

Bowles in New Position

Dr. Oliver Bowles, mineral technologist of the Bureau of Mines, has been designated by the Secretary of the Interior as superintendent of the new mining experiment station of the bureau to be established at Rutgers College, New Brunswick, N. J., and which will specialize in problems involved in the production and utilization of the various non-metallic minerals. Dr. Bowles will enter upon his new duties July 1.

Dr. Bowles was born in Canada and educated at the University of Toronto, obtaining his degree of B.A. in 1907, and of M.A. in 1908. The degree of Doctor of Philosophy was conferred by George Washington University in 1922. He was engaged in field work for the Ontario Bureau of Mines during 1908-1910, and was instructor in petrography at the University of Michigan in 1908-09. Until 1914 he lectured on rocks and minerals at the University of Minnesota, and made a comprehensive study of Minnesota quarries. The results of this work have been published as Bulletin No. 663 of the U. S. Geological Survey. Since 1914 Dr. Bowles has been stone quarry and non-metallic specialist in the Bureau of Mines, and has written many technical papers and articles. His labors have recently been directed chiefly toward quarrying problems in the lime industry.

The new station will undertake selected problems in mining, treatment of non-ceramic uses of such non-metallic minerals as bauxite, feldspar, Fuller's earth, graphite, gypsum, limestone, mica, phosphate rock, salt, sand and gravel, slate, sulphur, garnet, asbestos, and talc.

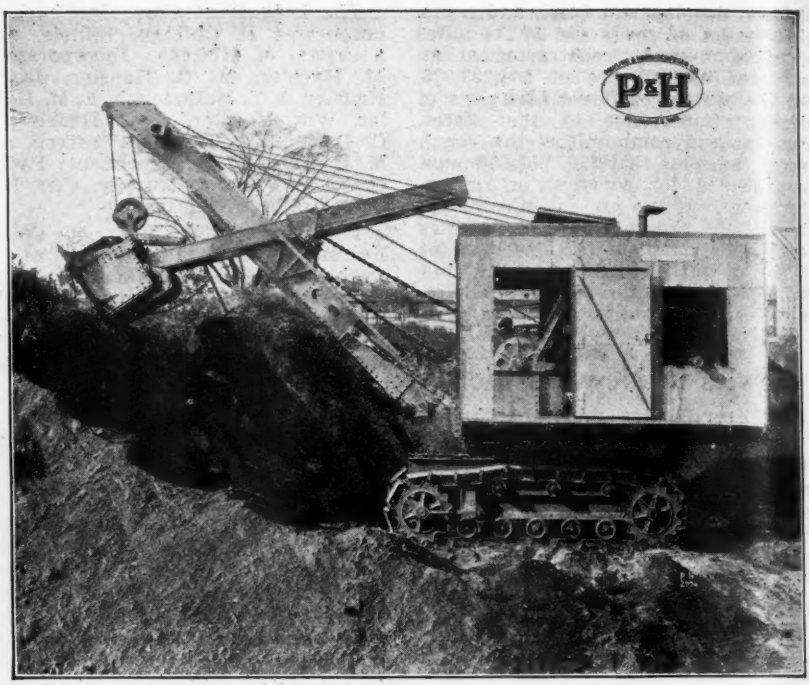
The Lake Sand Corp., has been incorporated at Chicago, Illinois, with a capital of $150,000. Incorporators: M. Hausler, M. G. Hausler, Jr., F. Hausler, J. T. McDonough, E. M. Hausler, Wm. Hausler, C. C. Hausler, P. C. Darby, Ella Seip, L. Thorsen, and M. D. Wilson. Correspondent: Paden, Crayden, Kahn & Murphy, City Hall Square Bldg., Chicago.

The Peoria Builders' Supply Co., of Peoria, Ill., have taken charge of the washed sand and gravel business, formerly owned and operated by the Peoria Washed Sand and Gravel Co. This business was purchased by the McGrath Sand and Gravel Co., on February 1.

Rutgers College to Study Non-Metallic Minerals

The Secretary of the Interior has designated Rutgers College, New Brunswick, New Jersey, as the location of a new mining experiment station of the Bureau of Mines, which will specialize in problems involved in the production and utilization of the non-metellic minerals. These minerals include bauxite, cement, clay, feldspar, Fuller's earth, graphite, gypsum, lime, mica, phosphate rock, salt, sand and gravel, sand-lime brick, slate, stone, sulphur, mineral paints, garnet, asbestos, and talc. The value of these non-metallic minerals produced annually in the United States is in the neighborhood of a billion dollars.

The choice of Rutgers College was determined largely by the fact that its location is a central one with reference both to the production and consumption of non-metallic minerals. The adjacent State of Pennsylvania alone has one and seven-tenths times as great a production of non-metallic minerals as all the States south of the Potomac and Ohio rivers combined. The New England and North Atlantic States, which are readily served from New Brunswick with a minimum of travel, have a combined non-metallic output of approximately 3½ times that of all the States south of the Potomac and Ohio rivers. Furthermore, about 75 per cent of the industries consuming the non-metallic minerals production center in the large industrial cities and are within easy reach of Rutgers College.



A New Size Gasoline Shovel

A one yard capacity shovel, operated either by gas or electricity, has been brought out by the Pawling & Harnischfeger Company of Milwaukee, Wisconsin.

The new machine is very similar in design to the P&H ½ and ¾ yard machines, which are being so widely used in all parts of the United States and even in India and Japan.

Being driven by gasoline or electric motor the machine is operated by one man, no fireman being required. The saving in this one man's wages alone amounts to a great deal of money.

Another feature of the gasoline or electric drive is the practical elimination of fuel and water hauling expense. Another advantage of the P&H is the ease of operation in inaccessible places. The P&H can operate at places where it would be impossible to operate a steam rig.

The crowding motion of the one yard shovel is of the standard P&H design. A manganese rack on the dipper stick is driven by a heavy thimble roller chain from a set of planetary gears. These gears are mounted on the forward drum of the machine. This gives a positive crowding motion regardless of the position of the dipper and enables the operator to bite into the heaviest digging.

The machine is designed to come within standard railway clearances with only a minimum amount of dismantling. This is a very important feature for machines that have much moving to do.

The shovel is mounted on the well known P&H Corduroy Traction so called because it really lays its own corduroy road. The traction is very rugged being built entirely of steel and is non-cloggable even in the heaviest going.

The Continental Clay Co., of Columbus, Ohio, has purchased the property of the Glacial Sand and Gravel Co., at Zanesville. By this deal the Columbus concern has acquired one of the best glacial sand deposits in the state.

The Pembroke Limestone Corporation, Roanoke, Va., has been incorporated with a maximum capital of $500,000, minimum $250,000. President, James P. Woods; secretary, Frank W. Rogers.

New Bay City Catalogue

The Bay City Dredge Works at Bay City, Michigan, describes Bay City equipment thoroughly in their new Catalogue E. The forepart of this book covers the one-man excavator, a machine that is primarily of interest to sand and gravel operators or other producers who require a small, inexpensive power shovel or crane. Pages 30 to 36 of the book are of interest more to road or general contractors, in connection with the Model 16 convertible crane excavator. This machine is illustrated with 6 different attachments, special attention being devoted to the skimmer scoop. Pages 38 and 39 briefly mention Bay City land dredges with various types of mountings.

The book is chiefly valuable because, rather than being devoted entirely to description, it is designed to include a great number of testimonial letters from present users. These letters cover pretty well the range of equipment shown and are representative of various sections of the country and various operating conditions. Copies of the catalogue may be had by addressing Bay City Dredge Works, Bay City, Mich.

McMyler Interstate Crane

A bulletin describing the McMyler-Interstate 10-ton crawler crane tells the prospective user everything that they would want to know about this piece of equipment. This machine will operate with any steel bucket or with a lifting magnet, back filler or skimmer scoop. It develops a single line pull of 10,000 pounds and a single line hoisting speed of 200 feet per minute. It will handle a 30, 35 and 40 foot boom, swing five complete revolutions per minute, climb a grade of 30 per cent without load, travel on its own power at a rate of 100 feet per minute, travel in any direction regardless of the direction in which the boom is pointing, start in any direction without the assistance of a ground man, and give free power to the crawlers. Along with the bulletin containing the general description of the 10-ton crane, the company sends data and specification sheets and detailed drawing which show clearly all the characteristics of the equipment. This literature may be secured by writing the McMyler Interstate Co., at Bedford, Ohio.

Baldwin Engineering Help

The Baldwin Chain and Manufacturing Co., of Worcester, Mass., manufactures a large line of chain, including steel rolled chain, steel block chain, malleable detachable chain, new chain replacement series, sprockets both cut and cast. The company offers to producers the use of its engineering department to aid in solving the problems surrounding the use of chain for transmission or conveying as related to modern operations. This chain is installed at many operations to which the company is glad to show prospective users. Additional information may be secured by writing the Baldwin Chain and Manufacturing Co., at their offices in Worcester, Mass.

Erie Lubricated Caterpillar

The new Erie Bulletin on the Lubricated caterpillar type mounting deals entirely with this particular topic, taking up in detail the exclusive lubrication system which is explained on page 9, and another exclusive feature, the bushing of the link pin bearings which are shown on page 13. The manufacturers of this equipment claim for these two features the accomplishment of the saving of many thousands of dollars in these alone. The book is well and completely illustrated. Right hand pages are devoted to text and illustrations on the various features, left hand pages to a large number of pictures of actual installations accompanied by testimonials from the owners. The book is well arranged, attractively printed and bound, and would be of interest to the average producer. Copies may be had by addressing the Erie Steam Shovel Co., Erie, Pa.

Link Belt Chain Drives

In a recent letter the Link-Belt Company asks users of machinery if they are satisfied with the way their machines are driven and invites them, if they are not satisfied, to investigate the possibilities of Link-Belt silent chain drives for which they claim an efficiency of 98.2 per cent. Enclosed with the letter is a return postcard, addressed to the Link-Belt Company, 910 South Michigan Av., Chicago, Ill., through which machinery users can order the 144 page Link-Belt Silent Chain Data Book, No. 125.

Russell Grader Co. Line

In the road building and earth handling machinery catalogue of the Russell Grader Company of Minneapolis, are described a large number of devices that will be of interest to producers in this field. Among these are Russell drag line or power scrapers, hoists, stripping scrapers, belt conveyors, revolving screens, dump wagons and a number of other devices for application around non-metallic mineral operations. Copies of the catalogue may be secured from the Russell Grader Company of Minneapolis, Minn.

"Mahrvel" Oil Equipment

After the producer in any of the non-metallic mineral industries has read through the Catalogue on oil burning equipment issued by the Mahr Manufacturing Company of Minneapolis, he will, besides knowing something about the "Mahrvel" line, very likely have learned something about oil burning torches for repairing steel plates, and about oil burning equipment of various other kinds. The book is devoted to many things that will not be of interest to producers in this field, but it also carries descriptions on a certain amount of equipment that would be of interest. Copies may be secured by writing the Mahr Manufacturing Company at the address given above.

Oil Bearing Sands of Colorado and Wyoming

Nearly every thick bed of sandstone in the great Cretaceous system of the West seems to contain oil at some locality, but the exact number of these beds, the region in which each produces oil, and the identity and stratigraphic position of each have not yet been fully determined.

A recent brief report issued by the Department of the Interior as Bulletin 751-A of the Geological Survey entitled "Continuity of Some Oil-Bearing Sands of Colorado and Wyoming," by W. T. Lee, deals with the correlation of rocks in the lower part of the Cretaceous system in Colorado and Wyoming, and with the bearing of this correlation on the discovery of oil and gas. These beds have heretofore been known by diverse names, and in this report an attempt is made to show their continuity through areas where they have been thus differently named. This identification of the beds furnishes to oil men a better basis for study and drilling. For example, the knowledge that a bed of sandstone which is known in some regions as the Dakota is in others known as the Muddy sand and that it overlies two other beds of sandstone that may be oil bearing is of obvious practical value to the oil driller.

New Holland Machine Co.

The New Holland Machine Company of New Holland, Pa., manufactures engines and small sizes of rock crushing and pulverizing equipment. This equipment is described in detail in a number of pieces of literature, issued by that company. The literature is devoted in each case to consideration of one particular line—for example, there is a recent catalogue on New Holland oil engines. This engine is thoroughly described in the catalogue mentioned. In other pieces of advertising literature are described crushers and a number of other machines. These are mostly of small sizes. Additional information may be secured from the New Holland Machine Co., New Holland, Pa.

Allis-Chalmers Official Passes Away

Mr. Henry Woodland, secretary and treasurer of the Allis-Chalmers Manufacturing Company, died suddenly at his home in Milwaukee on Monday, May 14th.

Born in Utica, N. Y., Mr. Woodland at an early age became connected with the New York Air Brake Company of Chicago. Later he was treasurer of the Gates Iron Works of Chicago. When in 1901, this company was taken over in the consolidation which formed the Allis-Chalmers Company, he became assistant treasurer of the new organization and afterward its treasurer. In 1916 he was elected secretary and treasurer of the company.

At the time of his death he was also vice-president and a director of the Hanna Engineering Company of Chicago.

A man of striking personality, keen judgment and extraordinary business sagacity, it was, however, Mr. Woodland's kindly, genial nature, his quick

sympathy and warm friendliness which so endeared him to the host of friends who mourn his death.

Mead-Morrison Hoist Line

Catalogue 21 of the Mead-Morrison Manufacturing Co., describes in detail the large line of hoisting machinery manufactured by this concern. Catalogue 21 is a book of 168 pages that is divided into four sections—steam hoists, electric hoists, belts and gasoline hoists and grab buckets. Under each of these headings various pieces of equipment are treated in detail. Many hoists of the company's manufacture intended for specific uses are described by text and illustration. The line is a large one and it is only by carefully arranging descriptions in this manner that justice can be done to the various types of equipment. Copies of the literature may be had by writing Mead-Morrison Manufacturing Co., at their executive office in East Boston, Mass.

Exports of Quarry Machinery

Mining and quarrying machinery is listed among the 100 chief exports from the United States according to value for the year 1922, in the summary of our world trade prepared and distributed in pamphlet form by the Chamber of Commerce of the United States. According to figures compiled of the export trade, mining and quarrying machinery for the year amounted to $6,571,000. This is in addition to boilers and engines for power plants, and locomotives and other equipment which goes with this class of machinery, and taken all together makes a good showing. Moreover the interest in good roads in other countries speaks well for the steady growth in the export trade in quarrying and crushing machinery.

National Hoisting Engine

The sixth edition of the National Hoisting Engine Company's catalogue of their equipment tells interestingly of hoists and engines built by this company. The catalogue has rather a different look from most that reach our desk; yet a very familiar look, too, for it is illustrated almost eatirely with woodcuts. The first 68 pages are taken up with descriptions of specific pieces of equipment ranging from complete hoists with engines down to small hardware parts. The balance of the book is taken up with illustrations of installations in various fields. The National Hoisting Engine Company of Harrison, N. J., will mail copies of the sixth edition of their catalogue to readers of PIT AND QUARRY upon request.

Milwaukee Gas Locomotive

The Milwaukee Locomotive Manufacturing Company of Milwaukee, Wis., have an interesting line of literature on the Milwaukee Gasoline Locomotives. These various pieces of literature are beautifully illustrated and contain complete descriptions. Throughout the series of advertising pieces are shown many of the uses in this field to which Milwaukee gasoline locomotives are at present being adapted. The advertising literature is apparently prepared largely upon the belief in the saying that "a good picture is worth a million words." Descriptions are no longer than is necessary to cover the ground. Copies of this company's literature may be had by writing the Milwaukee Locomotive Manufacturing Co., at Milwaukee, Wisconsin.

A $50,000 plant for the milling of feldspar quartz and mica from the quarries of the Basin Quarries, Inc., will be erected at Phippsburg, Oregon. The company, which is capitalized at $100,000, has for its president, Mr. Joseph F. Perry. Frank R. Marston is vice-president and Wm. C. Sherburne, treasurer.

The Winnebago County Labor Legion, Winnebago, Illinois, has endorsed a movement for the establishment of cement plant to be owned, operated and controlled by the State of Illinois. Such an institution would doubtless reduce the cost of concrete for the big road construction program which the state is contemplating during the coming years.

The Sparta Limestone Quarries, Inc., Sparta, Illinois, has been incorporated with a capital of $8,000. Incorporators: T. A. Roussin, G. W. Bevington, N. R. Lessley, H. J. Holdoway and Geo. F. Eiker, Correspondent, Thos. P. Edgar, Sparta.

Heavy Trade in East

Producers Kept on Edge to Get Most From Situation

By Our Eastern Correspondent

Heavy production and heavy distribution are the order of the day in the eastern sand, gravel and crushed stone markets. There is no let-up in the volume and keenness of call and producers are being kept on edge to handle the business that is going forward. All lines of industry which require rock and gravel materials are prominently in the market, and present indications point to a continuance of peak conditions for several months to come.

The construction industry at New York and vicinity maintains at a high point of activity, considerably in advance of this same time a year ago, and is a leader in demand for sand, gravel and kindred materials. Despite the fact that a number of large projects are to be held in abeyance until building costs are lowered, there is no noticeable relinquishment of operations, for the numerous smaller jobs are more than sufficient to keep producers, dealers and construction interests busy.

Building supply dealers are turning large quantities of sand, gravel and broken stone, seeking at the same time to hold up with reasonable reserve stocks. This is bringing increased business to the producing end, for contractors and others who purchase direct in quantity lots are forward with similar demands. Practically every workable pit is on the producing list, and a goodly number trying to secure larger working forces —almost an impossibility under the present conditions.

While there is no pronounced shortage of labor, there are more jobs than there are men willing to work. In consequence, there is a bidding for good help and natural raise in wage scale. Sand producers and clay mining interests are paying 45 and 50 cents an hour in the Raritan River section of New Jersey, just as is being paid in Long Island districts, and the men are not thoroughly satisfied. There is every appearance of an early demand for 5 to 10 cents more in this level and rather than meet this advance, it is likely that some producers will curtail their operations. This is the current sentiment.

There is a stiffening in quotations in the sand and broken stone markets, giving indication of ascending levels. Sand has already been moved forward under the heavy demand, and good quality washed gravel carries and indication of soon following. The threatened "buyers' strike" in the building trades certainly has not brought any easing in quotations up to the present time, and there is quite a definite aspect for a holding strictly to current figures.

Good quality sand has advanced in the wholesale market at New York from $1.00 to $1.25 a cubic yard in cargo lots, a situation that was prophesied in these columns in the last issue of PIT AND QUARRY. The change is due to higher labor costs. Brisk sales continue and the outlook for heavy consumption is good. Dealers are asking $2.25 and $2.50 for the material on the job, and there is now a strong tendency towards the latter quotation. There is still no change in fine white sand, which is being sold at $4.50 a cubic yard, delivered.

Best washed gravel is being quoted at the recently established $2.25 a cubic yard level, both for ¾-inch and 1½-inch stocks, carload lots. There is a good call for the material and stocks are rapidly absorbed. New York supply yards are selling gravel at $2.75, delivered on the job, while a number of Brooklyn dealers are asking a shade higher.

Crushed stone shows no change in the well-established levels of $1.65 and $1.75 for 1½-inch and ¾-inch sizes, respectively, in wholesale lots. At the same time, the heavy advance in road construction and accordant growing call for stocks, have developed a marked firmness in the present figures, and an increase in the near future would not occasion any great surprise. Supply dealers are quoting $4.00 a cubic yard for broken stone, delivered.

Portland cement is operating under a keen demand and large tonnage is being absorbed throughout the eastern district. The price level is holding to the figures recently established, or $2.30 and $2.35 a barrel, less sacks, alongside dock to dealers, and $2.70 and $2.80 delivered by truck. In the retail market, consumers are paying $3.20 a barrel, delivered, with the regular bag rebate of 10 cents each.

Nearby mills in New York state and eastern Pennsylvania are receiving heavy orders from this district and every effort is being made to furnish the demand, regardless of length of motor truck haul, where the freight situation is still unreliable.

The properties of the Garnet Grit Co., Denbury, near Franklin, N. H., recently acquired by the Ford Motor Co., Highland Park, Mich., will be actively worked by the new owner according to present plans. It is proposed to install a modern quarry plant, with separating, pulverizing and grinding mills in the immediate vicinity near the Wilmot highway. The entire tract approximates 200 acres of land, and the new plant is estimated to cost in excess of $100,000. The garnet material will be used by the Ford company at its glass plant in Pennsylvania for polishing service.

The Deer Island Granite Corporation, Stonington, Me., has been formed under state laws with a capital of $50,000 and 2,000 shares of stock, no par value, to operate a granite quarry in this section. Frank McGuire is president, and A. E. McGuire, treasurer. Percy T. Clarke, Stonington, is representative.

The Granite State Quarries Co., Concord, N. H., recently organized, has acquired extensive properties on Rattlesnake Hill and is perfecting arrangements for a large output of rough stone for building and memorial purposes. Improvements will be made in the present plant and employment given to about 75 men for initial operations. This number will be increased to more than 100 workers at an early date. Charles L. Jackson is president, and George A. Ledward, treasurer and general manager.

The Worlock Stone Co., Perryville, N. Y., is said to have plans under consideration for the rebuilding of its crushing plant and auxiliary works, destroyed by fire on April 30, with loss estimated at close to $100,000, including machinery. The reconstruction is expected to cost approximately a like amount. Royal D. Woolsey, Canastota, N. Y., is one of the heads of the company.

The Lima Quarries, Inc., Lima, N. Y., has been organized under state laws with a capital of $100,000, to operate a stone quarry in this section. The new company is headed by J. S. Crouse, F. McDonald and W. Le Feber.

Slate quarries at Granville, N. Y., have granted a wage advance of 7 cents an hour to workers in different departments, affecting all branches of production. The men asked for a 10 per cent increase and a compromise was made at the rate noted. Under the new scale trimmers will receive 57 cents an hour; splitters, 58 cents; and block cutters, 60 cents.

The Tuckahoe Stone Corporation, East Chester, N. Y., has been formed under state laws with a capital of $50,000, to operate a quarry and general stone works. The company is headed by A. Blanchi and D. Beretta. It is represented by Clark, Close & Davis, White Plains, N. Y.

Arrangements are being made for a dissolution of the partnership between Charles T. Kavanaugh, Graham Van Keuren and Samuel P. Martin, all of Paterson, N. J. covering the operation of the Sussex Quarry at Wantage, Sussex County. The plant has been producing stone for road construction purposes, and it is likely will be continued in operation under an individual ownership.

The Grove City Limestone Co., Grove City, Pa., is maintaining active operations at its plant and furnishing large quantities of material. Spring delivery for limestone for agricultural purposes has run into thousands of tons, and the plant is sold well ahead on ground stone for this service under capacity output. The call for nut sizes of material for road work is now increasing and arrangements are being made for large shipments to different nearby points.

The American Slate Works, Slatington, Pa., have plans under consideration for the rebuilding of the portion of their plant destroyed by fire on May 5, with loss totaling close to $100,000, including machinery. The plant consisted of a main four-story structure, 100x175 ft., equipped for roughing and finished production. William Harding is general manager.

The stone quarrying industry is undergoing a revival at Nicholson, near Wilkes-Barre, Pa., and several companies are perfecting plans for the reopening and operation of existing quarries, now long dormant. New machinery, pumping equipment and other apparatus will be installed. Up to about twenty years ago, this was one of the leading lines of activity here.

Banner Weeks at Lehigh

Mills, Worked up to Greatest Capacities, Break Records

These are banner weeks among the cement mills in the Lehigh Valley district of Pennsylvania. Every mill is busy, working to greatest capacity and new high production records are being established in a number of instances. The demand is holding up with increased force and orders on hand at the different plants are more than sufficient to insure maximum output for a number of months to come. The call from the construction industry which grew so intense in March is now being duplicated in the demand for material for new road construction, and practically every eastern state is drawing cement for this purpose.

With the production and distribution of cement for March and the first quarter of 1923, greater than for any similar period in the history of the industry, there is little question but what the second quarter of the year, now well advanced, will produce a similar record; it would not be surprising to see it higher. There has hardly ever been a time when the industry is so on edge as now found in the Lehigh Valley section.

As to be expected, labor is in firm demand in this district and good men have no trouble in securing employment at wages equal to those now prevailing in the steel business and other basic industries. But few mills have their full requirements in this line and while there is no distressing shortage of men, there is certainly no surplus. The wage situation since the advance of 5 cents an hour in April is satisfactory and there is no immediate trouble in sight between companies and workers.

The heavy call for production finds no relief in the available freight cars for distribution, and transportation is one of the problems now before the mills. The railroads to all intent are doing their best as regards the supply of rolling stock and movement, but there is still much to be desired. Fleets of motor trucks are bing enlarged and this means of transportation, even though it means an increased cost to the consumer, is assisting materially in relieving what would otherwise be a serious congestion. Happily, the mills in the Lehigh Valley district are so located with respect to primary market centers as to be able to utilize this means of distribution most effectively. The heavy truck loads leaving the plants are expected to continue well through the summer months, just as will the long trains of freight cars moving from these parts.

The big mill of the Atlas Portland Cement Co. at Northampton is maintaining operations on a full basis and every department of the plant is busy. All available men are being pressed into service and further additions are contemplated. Other plants of the company are equally active and there is no thought of any letup at the present time. Heavy production records are being established.

The Dexter Portland Cement Co., Nazareth, is running full and has followed the lead of the other companies in advancing the wage scale at its mill. Big orders are being slated for material for earliest possible delivery and no department of the plant will slacken except under extreme urgency for necessary repairs to equipment. Almost needless to say, a full working quota is being employed and efforts are being made to secure more men.

Both mills of the Coplay Cement Mfg. Co., Coplay, continue on the active list and record production is being developed in a number of departments. It is expected to maintain operations at the present status for an indefinite period and incoming orders lend all possible encouragement to the present peak situation. The company has recently filed a complaint with the State Public Service Commission against the Philadelphia & Reading Railroad Co. and the Ironton Railroad Co., holding that a discriminatory freight rate prevails on limestone from Myerstown to Coplay and Saylor, as compared with the tariff to other points of like distance. The case is expected to be heard at an early date. The company is a large consumer of limestone from the district noted.

The Lehigh Portland Cement Co. has all of its mills on a full production basis and is among the leading heavy producers in this district. The West Coplay and Ormrod works are said to be giving employment to more operatives than ever before, while the new Castle and Fogelsville mills are also heavy in this line. The latter

plant has been thrown open a number of times in recent weeks to students from eastern universities, who are making tours of inspection through this region. A large body came recently from Lehigh University, closely followed by others from Lafayette and Villa Nova; a delegation from Columbia University, New York, will visit the mill at an early date. The company is taking the visitors through the entire plant, from quarry to laboratory, and usually under the able guidance of Howard Rhode, head of the service bureau. Arrangements are being perfected for the early operation of the initial unit of the new mill of the company at Tarrant City, near Birmingham, Ala., upon which work has progressed rapidly through the winter months; it will be ready for service soon, and is expected to assist materially in helping to supply the call for cement.

The Alpha Portland Cement Co., Easton, Pa., is running under maximum output at its different mills, including the Martin's Creek plant, and has no intention of any curtailment. The Giant Portland Cement Co. is equally active at its mill at Egypt, as is also the Lawrence Portland Cement Co. at its Northampton mill. The Bath Portland Cement Co. is busy at the Bath, Pa. plant, with large working force.

The mill base in the Lehigh Valley district holds at $2.10 a barrel in carload lots, without bags, to contractors and dealers. This quotation seems quite well established, despite the fact of increased cost of production. It is evident that cement producers intend to hold to this level just as long as possible, and probably will withhold any advance through the summer season. A check has been given to the practice of "pyramiding" orders, as evidenced in a number of cases earlier in the season, whereby a purchaser would place orders with two or three mills at the same time in order to insure supply. This has led to difficulty and confusion, at the same time exaggerating the consuming demand.

The same base rate noted above applies at the present time at Mitchell, Ind., where the Lehigh Portland Cement Co. has a large plant; this $2.10 figure also holds at La Salle, Ill.; Hannibal, Mo.; and Mason City, Ia. A $2.00 level is current with the Universal Portland Cement Co., at Universal, Pa., while a $1.95 base now prevails at Steelton, Minn. and Buffington, Ind. The Atlas Portland Cement Co. and the Knickerbocker Portland Cement Co., are asking $2.20 at their mills at Hudson, N. Y., and this same base is current at Fordwick, Va., The rate at Wyandotte, Mich., has declined to $2.30 a barrel, the highest base at any of the mill points.

The Marquette Cement Mfg. Co., Chicago, Ill., with mill at La Salle, has added to its holdings by the purchase of the plant of the Cape Girardeau Portland Cement Co., Cape Girardeau, Mo., for a reported consideration of close to $2,000,000. The new owner will take immediate possession and purposes to develop maximum production. The plant has a rated production of about 25 cars a day and has been giving employment to approximately 200 men. It is said that the Marquette company will make extensions in the mill in the near future for larger output.

Activities in the cement industry on the Pacific Coast are reaching a peak condition, not only with regard to the operation of existing mills but in connection with the outlook for new construction. Property has been acquired at Exeter, Cal., by a company now being organized, headed by John F. Hamburg, an official of the Engels Copper Mining Co., Mills Building, San Francisco, to be used as a site for a large mill. The new company will be capitalized at close to $5,000,000, and purposes to dispose of bonds and stock to an amount of about $4,000,000, of which a large portion will be used for the new plant. The property is in the center of the San Joaquin Valley section, and comprises a large deposit of cement rock. A quarry plant will be built, with railroad line to the plant site, and the mill will consist of a number of main units for extensive production. The Yosemite Cement Co., recently organized by interests at Kansas City, Mo., and vicinity, has commissioned the Hunt Engineering Co., of that city, to prepare plans for its proposed new mill on the Merced River, near Merced, Cal., where a site of close to 1,400 acres of land has been secured. The plant will consist of a number of buildings, with power plant, machine shop and other mechanical structures and is estimated to cost more than $1,500,000, with machinery.

Indiana Ag Rate Down

Drop of 25% With Publication of New Tariff

By Our Indianapolis Correspondent

Indiana intrastate freight rates on agricultural limestone, used by farmers for soil treatment, will drop an average of about 25 per cent as soon as railroad companies can publish the new tariffs, John McCardle, chairman of the public service commission, has announced. He said "an immense amount" of the soil medicine is transported in Indiana each year.

"Mr. McCardle made the announcement at the end of a conference between Leo P. Day, an attorney for the New York Central Railroad Company and other railroad representatives, with O. P. Gothlin, the commission's freight rate expert. The new rates will come, Mr. McCardle said as the result of an agreement proposed by the railroads to settle a case Mr. Gothlin was pressing against them on behalf of the Indiana State Farm which manufactures much prepared limestone.

The Indiana Highway Commission has placed orders for crushed stone and gravel to the amount of $50,000, and in the next few days active operations will begin in placing non-rigid type roads in good condition for spring and summer traffic. This material will be distributed over 13 state roads and as they are repaired other highways of the Indiana system will receive attention as they show wear.

Members of the commission returned yesterday from a trip over southeastern Indiana highways which they found in good condition. "Contractors are busy on new state highways throughout Indiana," said John D. Williams, director of the commission, "and work on them will be pushed to completion."

The commission will this year build about 50 miles of roads of the penetration type, and the locations will be announced soon.

Contractors building roads for the state highway commission must complete their projects on scheduled time this year or they will be regarded as unfit to compete in the bidding for 1924 contracts, according to John D. Williams, director of the commission.

"Indiana is going to have a completed system of main market highways not only connecting all parts of the state, but facilitating interstate and transcontinental traffic by the end of 1925, and the state highway commission does not propose to be delayed by the failure of contractors to complete their work within a specified time," Mr. Williams said.

"Under the three-year paving program of the commission, 153 miles of highway will be hard-surfaced this year, 405 miles in 1924 and 400 miles in 1925, Mr. Williams said. Mr. Williams said that in 1922 the paving program proposed for the year was almost entirely completed on time. The warning, he said, is to improve, if possible, even that record.

The first day of June will see more overhead tacked onto the trade in Indianapolis and in the entire state, for that mattter, in the shape of a special tax of two cents per gallon on all gasoline used in trucks and automobiles. The bill passed the last legislature by a bare majority, a big fight against it being waged by representatives from the larger cities especially. It was pointed out during the session that retail establishments in the larger cities who operate trucks seldom sent their trucks outside the city and the purpose of the tax is to raise more money for country road improvements. The contention of the city retailers was that if such a tax were imposed, the money should go to improving city streets instead of country roads. There was a sufficient preponderance of country vote, however, to put the measure over and it was signed by the governor. The farm vote, however, saw to it that gasoline for tractors used for farm work was exempt from the operation of the law. Truck users here estimate that each truck will cost from $35 to $50 more per year to operate and they allege they will get no benefit from the money at all. Other than the farmers' tractors, the only form of gasoline exempted from the operation of the law is that form of naptha known as cleaners' naptha used by cleaners and dyers.

The Bromide White Lime Company, Kansas City, Mo., has increased its capital stock from $100,000 to $200,000.

Pittsburgh Prices Same

Establishing Output Records and See Good Season

By Our Pittsburgh Correspondent

The development of the spring season has brought rapid development in the production end of the sand and gravel industry at Pittsburgh, Pa., not to mention the accordant heavy distribution which has maintained for a number of weeks past. All of the producers are busy and the larger companies are keeping their fleets active on the rivers. High records for outputs are being established and there is every evidence of banner conditions for the coming months.

Prices hold substantially the same as those quoted in these columns in the May issue of PIT AND QUARRY. Good washed gravel is being sold f.o.b. floats at the Pittsburgh landings at $1.60 a cubic yard, while delivered on the waterfront the price stands at $2.00; for trucking the material to destinations from $2.50 to $3.00 is asking. River sand is now priced at $2.40 a ton in the retail market, delivered on the job, while in the wholesale market the figure is a little more than $1.00 lower. The material is operating under a good call.

Broken stone is quoted at $2.85 in the local wholesale market, for ¾-inch and 1½-inch stocks. Dealers are asking well around $4.00 for delivered material. Portland cement holds at $2.24 a barrel in cargo lots, wholesale; retail, a $3.50 figure prevails, with regular 10-cent bag rebate. Crushed slag is being sold in carload lots at the plants at $1.25 a net ton.

The Monongahela & Ohio Dredging Co. has been active during the past month or more in dredging sand and gravel with its dredger "Wabash," near Point Pleasant, and heavy shipments are being made to the local port and other points. The company has been using its dredgeboat, "Northern," at Colona, on the Ohio River, where a new landing is being made for the Colonial Steel Co. The dredger "Franklin" will be placed in service on the river at once.

The Valley Sand & Supply Co. is maintaining active operations with its fleet and doing a large business. A number of flat boats and other vessels have undergone necessary repairs for the spring season, and will be kept on the producing list for an indefinite period.

The Iron City Sand Co. has completed repairs to its steamer, "P. M. Pfeil," and will keep the vessel in active service on the river for hauling tows of sand and gravel from the dredger "Independent," stationed on the Monongahela River; operations are also being conducted at other points. Barges have been repaired recently for the company at Frank L. Hankey's boat yard, and the fleet is in excellent trim for heavy service.

The Duquesne Slag Products Co. is using its oil-burning towboat "Luzerne" on the Monongahela River, and daily trips will be made to haul material from Monessen to Allenport for an indefinite period.

The Keystone Sand & Supply Co. has completed a new unloading dock at Munhall on the Monongahela River, and will place the structure in service at once. The use of the new dock is expected to assist materially in operations at this point. The company has secured an order from the local Government engineers to furnish sand and gravel for the new esplanade to be constructed at Lock No. 6 on the Monongahela. Extensive production is being developed and the company dredgers will be active throughout the spring and summer months.

The Santiago Creek Rock & Gravel Co., Anaheim, Calif., has recently been incorporated with a capital of $50,000. The directors are: H. M. Dailey, J. Renfroe, L. H. Calderwood and F. R. Dennison.

Cement manufacturing plants in Western Washington are running under capacity production, giving employment to large working forces. It is said that orders on hand and incoming business are sufficient to insure the present basis of output for the remainder of the year. The International Portland Cement Co., Ltd., is busy at its mills, as is also the Inland Portland Cement Co., with plant at Metaline Falls. The Superior Portland Cement Co., Seattle, is producing under maximum operations at its mill at Concrete, and has plans in prospect for the construction of a new hydroelectric generating plant for additional power supply. Application for a site has been made to the state. The station will cost in excess of $150,000, with machinery.

Texas Building Active

Road Activity Also Keeps Sand and Gravel Men Busy

By Our Dallas Correspondent

Continued building operations, with no let-up in the demand for sand, gravel and other building materials, are noted in Texas, especially in the larger cities. Several large contracts have recently been awarded, or bids have been asked, and numerous office structures, schools, churches, and mercantile establishments are being erected throughout the state. Several of the larger cities of Texas, notably Dallas, Houston, Fort Worth and San Antonio, are building steadily and the demand for sand and gravel is reported especially strong in these cities.

Dallas is soon to undertake the erection of a $5,000,000 office building and warehouse to be built in co-operation with the Gulf, Colorado and Santa Fe Railway Company as a freight terminal and office building. This structure will call for large quantities of sand and gravel, and the material will be drawn from the pits near Dallas. Contracts have not been let, although several gravel dealers are preparing estimates and are figuring on these contracts.

Road improvement is in full swing in all parts of Texas, and hard-surface highways predominate in the construction. Gravel surfacing ranks next, and is employed generally on roads where there is little heavy hauling. Dallas county is now building the Belt Line, a gravel highway encircling the city just inside the county line, about 75 miles in length. Much of the gravel used on this highway is being furnished by gravel dealers to the county under contract, although the county is taking some gravel from its own pits.

Weather during the last few weeks has been favorable for hauling. There has been only limited rainfall and the roads have not become impassable. Motor trucks and wagons and teams have been able to negotiate the highways practically all the time.

The City of Dallas is now entering on an extensive street paving program, and is using large quantities of sand and gravel in laying concrete base on which a topping of asphalt is being spread.

Tarrant and Johnson Counties, adjoining Dallas County, are also engaged in building good roads under programs calling for the expenditure of large sums of money and the construction of highways along well defined lines reaching all parts of the counties as well as providing hard surface highways for the main state and national highways crossing these counties. Johnson county recently contracted for gravel from extensive pits near the city of Cleburne, owned and operated by private individuals. The county also purchased some gravel land and is now working its own pits.

Other counties over the state are also carrying out road building programs, and Texas now is building more improved highways than any other part of the country.

With the unusually heavy demand for sand and gravel, prices have remained unchanged in Dallas. Dealers generally report that they are working their pits to capacity, and have orders booked ahead, yet the price has remained stationary. Gravel is being delivered on the job in Dallas at prices ranging from $2.25 to $4.00 per cubic yard, depending on the distance hauled and conditions of delivery. Gravel f.o.b. cars at the pits can be had for $1.50 per cubic yard.

One of the most profitable sand pits in Texas, it is disclosed, is that operated by A. J. Justice, a ranchman near Justiceburg, in Garza county. Mr. Justice found an excellent quality of bank sand on his ranch, and induced the Santa Fe to build a spur track to the pit. A steam shovel and drag line were installed for loading, and Mr. Justice is now receiving a net revenue of $20,000 a year from the sand taken out of this pit. Good building sand is comparatively scarce in that section, and Mr. Justice is able to dispost of all the sand he can take from the pit.

The City of Cisco, in Eastland County, has awarded a contract for twelve blocks of brick pavement, to cost $40,700. Work is now under way on the paving. When these twelve blocks are completed, Cisco will have more than eighty blocks of street paving.

Kaufman County, Texas, is entering on a road improvement program call-

ing for the expenditure of $1,000,000. S. J. Treadway, formerly of Temple, Texas, has been employed to take charge of the work. Twenty miles of highway to be built by the county will be of concrete, and about fifty miles of gravel.

Henrietta, Texas, in Clay County, has made headquarters for road construction to be undertaken in that county. A bond issue of $2,500,000 was recently voted, and contract soon is to be awarded for the construction of a concrete highway entirely across the county along the Colorado-To-The-Gulf highway, a distance of more than 40 miles. Considerable gravel roads will be built, leading to the concrete highway.

The Universal Gypsum Company has recently been organized at Sweetwater, Texas, for the purpose of establishing a plant there for the manufacture of cement, plaster and similar building materials. An extensive bed of gypsite has been located northwest from Sweetwater, near Rotan, which will be worked by the company. A large plant is being built, to be operated by electric power, and it is expected to be in operation soon.

E. L. Bevington of Chicago, has become interested in the development of Texas clay deposits, which, he says, is the finest in the world for the manufacture of chinaware. A large plant is to be established in West Texas for the handling of this clay.

Announcement has been made by officials of the Endowment Fund for DePauw University at Greencastle, Ind., that the Midwest Crushed Stone Quarries of that city, is among the twenty business organizations there to donate $1,000 or more to the fund.

The Pleasant Lake Gravel Co., an Ohio corporation has qualified to do business in Indiana with a total of $45,000 of its capital represented in the state. The company will do business in gravel, crushed stone and sand, and H. A. Perry of Pleasant Lake, Indiana, has been named as agent.

The Milford Gravel Co., of Ligonier, Ind., has purchased the farm of Wm. Francisco, three miles east of Ligonier, and are erecting a large gravel plant which they intend to operate on an extensive scale.

Lime Prices Guaranteed

New York Market Will Remain Stable for Current Year

Barrelled finishing lime interests in New York were the first to meet labor's defi to standardize their prices to the building investing public as a component of a similar movement on the part of organized building craftsmen.

Edward B. Page, New York manager of the Rockland-Rockport Lime Company, one of the dominant distributors of barrelled finishing lime in the eastern part of the United States, commended the attitude of labor in its willingness to forestall a general buyers' strike in the building industry, announced that his company had guaranteed dealers and distributors wherever his company served, against any price change for his company's commodity from now until January 1, 1924.

C. J. Curtin, one of the leading manufacturers of lime in New England, advised the Dow Service Daily Building Reports of his decision to meet the situation as squarely as the labor interests have put it up to building investors that as far as Farnham-Cheshire finishing lime was concerned, he had already guaranteed the trade against a price advance for the remainder of 1923.

The lime men tersely summed up their policy as follows:

"The building industry needs more labor. It cannot wait for labor to come in by virtue of legislation affecting immigration. If labor is willing to take its place in line to insure a longer period of building prosperity and the mason material dealers can have adequate protection against price advances for the remainder of the year, there is no reason why this era of building prosperity should not continue. The postponement of Government and other big building projects in a tight building market like the present one, is salutary. Labor makes a conciliatory move. It invites building material manufacturers, dealers and contractors to meet them foursquare purely for the purpose of insuring a continuation of prosperity in the form of building construction progress spread out uniformly instead of attempting it at a peak. The line is thus clearly defined for the entire building industry."

Fight Wages in Ohio

And Is Likely to Continue for Another Month

By Our Cincinnati Correspondent

The holding up of road building work in Ohio is beginning to reach the pinnacle point in the complex situation between the political fight of Governor Donahey and State Highway Director Leon C. Herrick. The Governor has declared that the road material interests have a stranglehold upon the highway department as now operated. The Democratic Governor finally has refused to permit the Republican Director of Highways to go ahead with his road building program by refusing to permit the state director of finance to pay money on old contracts awarded. Latest developments are court actions by construction companies to compel the finance director to certify estimates.

On May 14th, the Highway Construction Company of Elyria, O., instituted suits to compel Finance Director W. E. Baker to certify current estimates due on four highway jobs partly completed by that company. The projects in question involve some $600,000.

In the meantime State Highway Director Herrick is awarding contracts contrary to the orders and desires of Governor Donahey, who wishes to await the highway director's expiration of office July 1st. More than a million dollars was involved in contracts awarded during the middle of the month for various road building projects by Director Herrick, covering expenditures in all parts of the state. What the termination of this interesting and complex road building situation will be is of much interest to the basic material interests of Ohio who are pinning their hopes on a considerable road building program in the much needed sections of the state.

Production and sale of sand, gravel, and cement, including quantities of lime, reached almost unprecedented proportions during the first four months of 1923, according to building material men in the southern section of Ohio. The building boom which had its start the last quarter of 1922, swept on in increasing figures in 1923, calling on the available supplies of the basic materials. Although prices of sand and gravel have not reached the high levels of other materials necessary to the completion of building, during the last few weeks, some hesitancy on the part of builders has been shown in further construction work on account of soaring prices. This hesitancy has of late had its reflection on the basic material market and late reports indicate that unless prices of other building materials come down, the favorable period enjoyed by sand and gravel producers and other material men will at least be temporarily enjoined. In the mean time prices are stationary. Washed gravel is quoted at $1.50 a ton, f.o.b. cars, sand sells at $1.20 f.o.b. cars. Prices for cement and lime are $2.99 a barrel for the former and $16.80 a ton for the latter.

President F. E. Hall, of the Ohio Sand and Gravel Producers' Association, is preparing steps for the Ohio association to take action on the 15 per cent increase on the tariff regulations on sand and gravel. T. J. Hall & Company, of which President Hall is the head, is moving right along with their river diggings, although the many May rains have handicapped production by creating high water conditions. Mr. Hall declares that much construction work is being held up on account of high building material prices, but predicts that the big period of construction work is yet ahead, and the sand and gravel may expect favorable developments.

The Ohio Ballast Gravel Company has received additional awards for supplying ballast to the various railroads.

Building material houses report an ordinary month of business. Some unsteadiness in new building, and the lack of a regular road building program being carried out in Ohio, together with many days or rain, have had a detrimental effect on the market during the month of May. The Cincinnati Builders Supply Company has been affected somewhat by the unfavorable weather, although a good business was consummated. L. G. Wilde of the company announces that there are adequate supplies of all materials on hand, in fact more than the normal amount.

W. J. Heintz, sales manager of the Moores-Coney Co., building supply house handling large amounts of basic materials in the southern district of Ohio, states that the market is firm.

Powdered Coal Firing In Vertical Lime Kilns

The use of powdered coal in the vertical kiln is suggested by one of our readers as the most desirable improvement that could be made in the lime industry, from the operating viewpoint. This gentleman, Mr. F. O. Cheney, of the Cheney Lime Company, Allgood, Alabama, says, "This field" (the use of powdered coal in vertical kilns) "is unexplored so far as the lime industry is concerned. However, its use is standardized in many industries. We consider it practical but expensive to install This would constitute the greatest step in the lime industry since hydration was developed."

In the abstract, powdered coal possesses many advantages over the same fuel stoked in the regular way. Still speaking in the abstract, lime could be made with greater ease, better control and more certainty of a superior product when using a fuel whose burning can be regulated more readily than the burning of coal in a regular fire box. Departing from the abstract and attempting to consider the subject in the concrete, we find our path beset by a variety of obstacles. To imagine a variety of ways in which powdered coal burners could be applied to a vertical kiln is easy. To actually apply burners in any particular way and with any degree of confidence is quite another thing.

In an academic discussion many reasons could be brought up for and against the use of pulverized coal and for and against particular applications of the method. But the truth will never be known until some producer shoulders the "white man's burden" and actually applies pulverized coal firing to an existing or a specially designed vertical kiln. It was so when the rotary kiln was first put forward as a piece of equipment that might possibly have a use in the lime industry. The "white man's burden" has not yet been laid down by the rotary kiln operators. They are still perfecting their equipment and developing standardized operating methods that will be the universally accepted practice of tomorrow.

The only thing that will really give light on the use of powdered coal in a vertical kiln is the installation by some producer of this method. Undoubtedly, many plants could in this way find economies. On the face of it only a fair sized plant with a large demand for pulverized coal will justify the expense of installing a coal pulverizing unit.

Who will be the first explorer in this new field?

Changes in Personnel of Bureau of Mines

During the absence in Europe of George S. Rice, Chief Mining Engineer of the Bureau of Mines, Department of the Interior, and until further notice, James W. Paul will be Acting Chief Mining Engineer, with headquarters at Washington.

C. A. Herbert is detailed to Pittsburgh to serve as Acting Chief Coal Mining Engineer, beginning June 1 for a period of five months, and will report through the Superintendent of the Pittsburgh Station to Mr. Paul. He will have immediate charge of the Experimental Mine work and other coal mining investigations, except the coal waste inquiry for the U. S. Coal Commission, which work will be handled directly by Mr. Paul.

M. van Siclen, Assistant to the Chief Mining Engineer, will continue in that position and act as executive officer for the Mining Division, consulting on technical matters with the Acting Chief Mining Engineer. He will also act in the capacity of District Mining Supervisor in leasing matters, except petroleum, on Indian lands, and will maintain contact with the Commissioner of Indian Affairs on all Indian mineral leasing matters, consulting with H. I. Smith on coal leasing technical matters.

H. I. Smith will continue as Mining Supervisor and will report through the Assistant to the Chief Mining Engineer on administrative matters, consulting with the Acting Chief Mining Engineer on technical matters.

S. P. Howell, after July 1, will be detailed to the field investigation of liquid oxygen explosives under the new appropriation. J. E. Crawshaw will continue to serve as acting head of the Explosives Section and report through the Superintendent of the Pittsburgh Station to the office of the Chief Mining Engineer.

The Kickapoo Sand and Gravel Co., of Peru, Indiana, has increased its capital stock from $20,000 to $50,000.

Canadian Company Reorganized

The Toronto Cement Corporation Limited has been incorporated with a capitalization of $3,000,000, and has taken over the buildings, machinery, properties and assets of the Ontario Cement Company Ltd., of Brantford, Ontario.

The officers of the company are:
A. J. Young, president.
Col. J. Z. Fraser, vice president.
A. M. Harley, secretary.
C. A. Patterson, treasurer.
H. C. Shields, chief engineer.
Geo. McCrae, resident engineer.

The executive offices of the company are at 506 C. P. R. Building, Toronto, Ontario.

The new corporation will continue and complete the work started by the Ontario Cement Company Limited, on its property at Beachville, Ontario.

All the buildings are planned for an ultimate capacity of 4,500 barrels of cement per day, and plans are now being completed for the installation of the first unit, of 1,500 barrels per day.

One 11 by 200-foot rotary kiln will be installed, together with the necessary raw and clinker grinding machinery. The new kiln building, fuel mill and cement stack house are practically completed. In addition to these buildings, a new raw material storage building is being planned, 570 feet long and 80 feet wide, together with raw and clinker grinding building, blacksmith shop, machine shop, oil house and store house. The coal, gypsum, clinker, limestone and clay will all be housed in the new storage building, and will be served by two high-speed, 15-ton, electrically operated overhead cranes.

The plant is located on the main line of the Canadian National Railway, between Woodstock and Ingersoll, and connections will be made with the Canadian Pacific Railway which is directly south of the property. The Provincial Highway parallels the property, and it is proposed to use large capacity trucks and trailers for cement shipments within certain distances of the plant.

The United States Gypsum Co., of Chicago, Ill., has declared its regular quarterly dividend of 1 per cent on the common and 1¾ per cent on the preferred stocks.

Death of O. A. White

Oscar A. White, advertising manager for Fate-Root-Heath Company, Plymouth, Ohio, died at his home in Plymouth, April 22. Mr. White was well known among the trade, and will be especially remembered for his stirring address before the convention of the National Crushed Stone Association in 1922.

He was born at Salamonia, Jay County, Indiana, November 21, 1860. He graduated from Lebanon (Ohio) College in 1879, and was principal of Ridgeville (Ind.) High School for several years.

In 1879 he married Anna Anders, who, with one daughter, survive him.

He studied law, and was admitted to the Indiana Bar in 1893.

Newspaper work always appealed to him and at different times he was the owner or editor of publications at Ridgeville, Ind., Mt. Gilead, Ohio, Greenfield, Ohio, and Plymouth, Ohio.

From 1908 to 1912 he was the Chicago manager for the American Press Association.

In 1920 he became advertising manager for the Fate-Root-Heath Co., Plymouth, Ohio, which position he held until the time of his death.

In addition to his literary attainments, Mr. White was renowned as an orator of exceptional ability.

He was a member of the Methodist Church, and active in all community affairs. He was beloved by all who knew him for his unimpeachable character, wise counsel and staunch friendship.

Notice has recently been received of the removal of the Link-Belt Company's Pittsburgh branch office from their old quarters at 1501 Park Building to their new and more commodious offices at 335 Fifth Avenue. Mr. T. F. Webster, manager of the Pittsburgh office, says that larger space and the more convenient location was imperative because of the extraordinary volume of business transacted during the past year and which promises to remain in full swing at least for the coming fiscal year.

The Gypsum Industries moved their office on the first of May, from 445 Conway Bldg., to the seventh floor of the American Fore Building at 844 Rush Street, Chicago, Illinois.

KENNEDY BALL BEARING GEARLESS CRUSHERS

WHY THEY LEAD

1—They are noiseless and run like watches.

2—50% greater capacity for same power.

3—Practically no wear on anything but head and concaves.

4—Short shaft and saving in head room with packed dust collars.

5—Shaft reinforced with self-locking head so that it cannot break where 90% of shafts have broken.

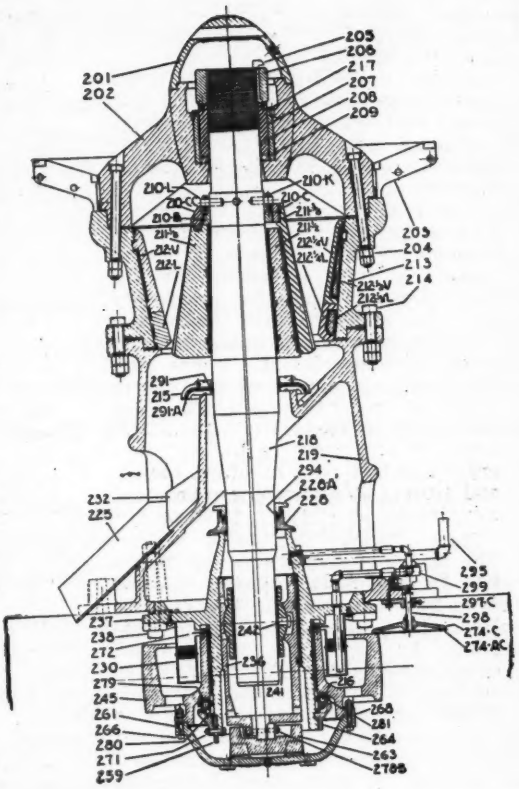
6—Can be driven right, left, or standard, as sent from shop.

7—Eccentric is turned by flexible coupling attached to pulley, which prevents side thrust and heating, as in geared crushers.

8—Ball and socket eccentric, self-aligning, eliminating friction and heating. Runs for years without attention.

9—Positive circulating oil system through filter and cut geared oil pump.

10—Made in our own shop by experts, trained for the job.



11—It is a crusher with the trouble left out. See it in operation, and you are unfit to listen to any geared crusher salesman. In fact, if you are near one of his machines, you can't hear him, if you were so inclined.

12—Our fine crusher does the work of 4 geared crushers.

Send for catalogue and tell us what your problems are, and one of our experts will call on you without obligation on your part.

KENNEDY VAN SAUN MFG. & ENGR. CORP.

50 Church St. **NEW YORK**

CIE. DES. ENTERPRISES INDUSTRIELLES, PARIS

Cuts Out Three Fans

The new improved form of gelatin recently placed on the market by the Atlas Powder Company is reported from all sections where it has been used as giving extraordinary results, not only in its all-around efficiency as an explosive, but in respect to the negligible amount of fumes evolved.

One foreman advises that his men are strong for the new gelatin as they have cut down on the number of sticks to the hole and cut out three fans as gas don't bother at all.

Another, a resident engineer on a large tunnel operation, reports that his men could return to work in 12 to 18 minutes, while with the old style gelatin it required at least 30 minutes before the men could return, and then they could not stay.

In addition to these advantages, the manufacturer of this new explosive advises that it is extremely high in water resistance and also practically perfect in plasticity—two properties that are of extreme importance in most underground operations, where wet work is often encountered and where loading in upward or pitching holes is necessary so frequently.

Two Westinghouse Publications

The Westinghouse Electric & Manufacturing Company recently issued Leaflet 2390-A, describing the Type E, engine-driven alternating-current generators. In this leaflet the construction of these generators from 50 to 3,000 kv-a. is illustrated and described.

These generators are applicable to all prime movers, being suitable for direct connection to steam, gas, and oil engines, or slow speed horizontal water-wheels.

The Westinghouse Company has also issued Leaflet 3477-B, which is descriptive of the hot spot indicator for transformers. The device is illustrated with photographs and wiring diagrams showing how the indicator functions and how it is located in the transformer.

The Adamantread Co., Manhattan, N. Y., has been incorporated with a capital of $10,000 to manufacture cements. C. R. Taylor, S. Plotnick and P. F. Wicksel. Attorney, B. H. Wicksel, 362 Fifth Avenue, New York City.

Fluorspar In 1922

The Department of the Interior, through Hubert W. Davis of the Geological Survey, reports that the domestic fluorspar-mining industry showed considerable improvement during 1922, recovering from the severe slump of 1921. The improvement was due principally to a larger demand for fluorspar of fluxing grade in the steel industry, which took about 86 per cent of the mineral shipped in 1922.

The producers of about 70 per cent of the basic open-hearth steel made reported that they consumed 72,962 short tons of fluorspar in 1922 and had stocks on hand amounting to 45,637 short tons on January 1, 1923. If the steel companies which did not report consumed a like proportion of fluorspar, the figures given indicate a total consumption in all steel plants of about 104,000 tons in 1922 and total stocks of about 65,000 tons on hand January 1, 1923.

Heil Anniversary

The Heil Company, Milwaukee, observed its twenty-second anniversary in May.

Conditions have changed in many ways since 1901. The products originally built have also changed. In 1912 the Heil Co. built the first steel dump body for the present Sterling Motor Truck Co. The Heil Co., originator for this class of equipment, have steadily grown and developed this line until today the company stands foremost in the manufacture of dump bodies and hoists for motor trucks.

In 1919 the Heil Co. took over the Hydro Hoist Co., the first successful manufacturer of underbody hydraulic hoists for motor trucks. The Hydro Hoist has proved to be the first practical underbody hoist. It is the real pioneer in the underbody hydraulic hoist filed and has been widely adopted by leading motor truck manufacturers.

The United States Slate Co., Pen Argyl, Pa., has resumed operations at its local quarry and plans for extensive production. A large working force will be employed. It is expected to keep the plant on the active list for an indefinite period.

Move More Material at Less Cost

Western Dump Cars—Dumped Position.

Your dump car installation is an important factor in quantity production and the consequent lowering of cost. You are urged to study the performance of Western dump cars in Pit and Quarry work. Let us refer you to the Western installation nearest your plant.

Western dump cars are famous for their dependability—great production and small cost of maintenance.

Western

That's Why

Tell us your haulage problems—haulage is our specialty. Perhaps we can help.

Western Wheeled Scraper Company

Earth and Stone Handling Machinery

1400 Farnsworth Avenue

AURORA, ILLINOIS

Self-Dumping Body

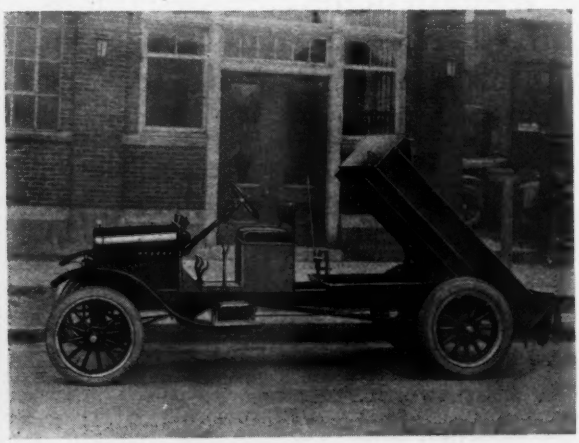
The Wood Hydraulic Hoist and Body Co. of Detroit are building for use on the Ford truck an interesting self-dumping steel body unit. The body is constructed entirely of steel and of the same general design as the many thousands of steel dump bodies which the Wood company has supplied for use on the heavier types of trucks.

The body, with its mounting frame, hinges and locking device, is a complete unit ready for placing on the truck frame.

The hinges on which the body tilts are of ingenious design embodying two hinge pins or fulcrums. The two fulcrum points have a definite effect to displace the center of the loaded body towards the rear, while dumping, assuring quick action and obtaining a high dumping angle to discharge the body contents.

The body is returned to the down and locked position by a handle attached to the front of the body; only a slight effort is required as the body when empty is in a balanced condition. The releasing handle is arranged for convenient operation by the driver, and positively locks the body against accidental operation when truck is in rough going. The body has a "three point support," a very desirable feature, which prevents body being effected by weaving or twisting of the truck frame.

The tail gate opens and closes automatically, requiring no attention from the driver.



Self-dumping body for Ford truck

Recent Patents

The following patents of interest to readers of this journal recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trademark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c each. State number of patent and name of inventor when ordering.

1,451,803. Locking devise for power-shovels. Edwin J. Armstrong, Erie, Pa.

1,452,154. Rotation release for rock-drills. Charles C. Hansen, Easton, Pa., assignor to Ingersoll-Rand Co., Jersey City, N. J.

1,452,218. Pulverizing-mill. Ralph E. H. Pomeroy, Canton, Ohio.

1,452,581. Rock-drill. Clarence R. Welch, Denver, Colo.

1,452,734. Rock-drill. Gustav Griesche, Berkeley, Cal.

1,453,540. Bucket. Fitch H. and Fred S. Beach, Charlotte, Mich.

1,453,805. Dipper-tooth. Wesley G. Nichols, Chicago Heights, Ill., assignor to American Manganese Steel Co., Chicago, Ill.

1,453,813. Dipper-front. Ellison E. Vanderhoef, Jerome, Ariz., assignor to American Manganese Steel Co., Chicago, Ill.

1,453,927. Grab-bucket. Warren J. Eaton, Midland, Pa.

1,454,032. Excavator front-end construction. Svante R. W. M. Bager, Werner Lehman, and Frederick C. Ruhloff, South Milwaukee, Wis., assignors to Bucyrus Co., same place.

1,454,140. Separator. Thomas J. Sturtevant, Wellesley, Mass., assignor to Sturtevant Mill Co., Boston, Mass.

1,454,486. Bucket-lip. John W. Plant, San Mateo, Cal., assignor to American Manganese Steel Co., Chicago, Ill.

1,454,781. Excavating-machine. Roy E. Will, Arcanum, Ohio.

1,455,553. Motor rotation for rock-drills. Fred M. Slater, Easton, Pa., assignor to Ingersoll-Rand Co., Jersey City, N. J.